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The Reaction of the Security Market to the Quality of Segmental Disclosures: an Empirical Investigation.

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THE REACTION OF THE SECURITY MARKET TO THE QUALITY OF SEGMENTAL DISCLOSURES: AN EMPIRICAL INVESTIGATION

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ABSTRACT

This research was undertaken to examine the securities market reaction to the quality of segmental disclosures required by FASB Statement Number 14. The investigation updates the previous empirical studies which examined the securities market reaction to the Securities and Exchange Commission's Segmental disclosure rules.

Information from three hundred diversified firms and their beta values were obtained from the Value-line tape. One hundred and fifty of the firms were required to report segmental data in their annual financial reports. They were referred to as the experimental group. One hundred and fifty diversified firms were not required to report segmental data in the annual reports. They were referred to as the control group.

The first step was to compare the systematic risk of the experimental group with the control group by using parametric and non-parametric statistics. The second step was to evaluate the quality of segmental disclosures in the annual financial reports of the experimental group. Based on the disclosure quality, the sample was divided into the high quality disclosure and the low quality disclosure groups. SIC code scores were calculated for each

firm of the experimental group. A Spearman Rank Correlation test was conducted to determine the correlation between the disclosure scores and the SIC code scores. The results of this test indicated that the correlation of the two scores was statistically significant.

Multiple Discriminant Analysis was applied to the high quality and low quality groups, based on twelve financial variables which are often discussed in the literature as affecting systematic risk. The results indicated that the two groups were homogenous with respect to these financial variables.

In examining the securities market reaction to the segmental disclosures, two major groups were identified:

(1) The Control Group

(2) The Experimental Group (subdivided into two groups)

   a. The High Quality Disclosure Group.

   b. The Low Quality Disclosure Group.

The Kolmogorov-Smirnov two-sample test and the student's t-test, were used to find differences between:

(1) The Control Group and the Experimental Group.

(2) The Control Group and the High Quality Group.

(3) The Control Group and the Low Quality Group.

(4) The High Quality Group and the Low Quality Group.

Finally, the Analysis of Covariance test was also conducted to find differences between the high quality

disclosure group and the low quality disclosure group.

The parametric and non-parametric tests gave essentially the same results:

1. The Kolmogorov-Smirnov test results indicated that there was no significant difference between the beta cumulative distributions of the control group and the experimental group.

2. The student's t-test results indicated that there was no significant difference between the two group means, but the two group variances were significantly different.

3. Both test results indicated statistically significant differences between the control group and the high quality group.

4. The two test results indicated statistically significant differences between the control group and the quality group.

5. The final test examined the differences between the high quality disclosure and the low quality disclosure groups. The Kolmogorov-Smirnov, the student's t-test and the Analysis of Covariance test were applied. The test results indicated that the betas of the two groups were significantly different and that their quality of disclosures were also significantly different.

Based on the above results, conclusions were drawn as follows:

1. The quality of disclosure is statistically related to the systematic risk.

2. The results showed that the high quality disclosure firms have lower systematic risk than either the control group or the low quality disclosure group.

3. Investors are uncertain about the segmental data that are not disclosed or that are not adequate and informative.

CHAPTER 1

INTRODUCTION

The Accounting Principles Board (APB) of the American Institute of CPAs issued Statement Number 2, entitled "Disclosure of Supplemental Financial Information by Diversified Companies", in April, 1968. The statement urged the diversified companies to report segment information voluntarily. In 1969, the Securities and Exchange Commission (SEC) required the registrants (publicly traded diversified companies) to disclose sales and earnings by line of business.

In 1969, financial analysts, creditors, investors and other users of financial statements urged the accounting profession to address the issue of reporting financial data for segments of a diversified company. The Accounting Principles Board supported this idea and reiterated that the objectives of financial statements should include the following:

(1) to provide reliable financial information about the economic resources and obligations of a business enterprise;

(2) to provide relevant financial accounting information so that users could make economic

decisions;

and

(3) to provide information that is understandable to the prudent users of the information (APB Statement Number 4, 1975).

To meet these and other objectives, financial analysts, accountants, creditors and other financial statement users urged the Financial Accounting Standards Board (FASB) to issue a pronouncement on the disclosure requirements of diversified companies.

In December, 1976, the FASB issued Statement of Financial Accounting Standards Number 14, "Financial Reporting of Segments of a Business Enterprise", which described industry segments, the tests of reportable segments and the requirements for segmental reporting disclosures. An industry segment is defined by the FASB as a "Component of an enterprise engaged in providing a product or service or a group of related products and services primarily to unaffiliated customers (i.e., customers outside the enterprise) for profit" (FASB Statement Number 14, paragraph 9).[1] Holzapfel[2] identified three factors to be considered in determining industry

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[1] AICPA Professional Standards, Financial Accounting Standards Board, Statement Number 14, Paragraph 9.

[2] Ibid.

segments: (a) the nature of the product, (b) the nature of the product process, and (c) markets and market methods. Another factor mentioned in FASB Statement Number 14 is that companies can treat foreign operations as segments under some circumstances specified by the statement.

Once industry segments are determined, they must meet one of the following tests to be considered reportable segments: (a) its revenue must be ten percent or more of the combined revenue of all the companies' segments; (b) the operating profit or loss must be ten percent or more of the combined operating profit of all industry segments that did not incur an operating loss, or the combined operating loss of all industry segments that did incur an operating loss; and (c) the identifiable assets of each reportable segment must be ten percent or more of the combined assets of all the companies' segments. The Board stated that:

> the reportable segments of an enterprise shall represent a substantial portion of the enterprise's total operations. The following test shall be applied to determine whether a substantial portion of enterprise's operations is explained by its segment information. The combined revenue from sales to unaffiliated customers of all reportable segments (that is, revenue not including intersegment sales or transfers) shall constitute at least 75 percent of the combined revenue from sales to unaffiliated customers of all industry segments. The test shall be applied separately for each fiscal year for which financial statements are presented.[3]

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[3]AICPA Professional Standards, op. cit.

In addition to the tests of reportable segments, FASB Statement Number 14 requires that diversified companies disclose the following segment information:

(1) the revenue information of a reportable segment,
(2) the sales or transfers to other industry segments,
(3) the basis of accounting for intersegment sales or transfers,
(4) segment operating profit or loss,
(5) expenses incurred by each reportable segment,
(6) the tax effects of operating income or loss,
(7) all identifiable assets including depreciation, depletion and amortization expense,
(8) capital expenditures,
(9) equity in the net assets of unconsolidated subsidiaries and other equity method investees,
(10) the geographic area in which the reportable segment operates,
(11) the foreign operation information, and
(12) the major customers.

There are three options a company may adopt in reporting segment information. The first option allows a company to include the segment information within the body of the financial statements with appropriate explanatory disclosures in the footnotes to the financial statements. The second option allows a company to present segment

information entirely in the footnotes. The third option allows the information to be presented in a separate schedule.[4]

STATEMENT OF THE PROBLEM

The major purpose of the study was to examine the reaction of the securities market to the quality of segmental disclosure rules of FASB Statement Number 14. The investigation was to determine whether the quality of segmental disclosures had any effect on investors' decisions. Quality of segmental disclosures as measured in the study relates to completeness and location of the disclosures as well as the manner of presentation, i.e., schedular, geographical, or narrative form.

The research was based on the assumption of the efficient market hypothesis of the semi-strong form which states that all publicly available information is impounded rapidly in security prices.[5] One problem addressed in this study is whether or not the segment data is new information, a second problem is whether the securities market can distinguish the quality of segmental disclosure

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[4] AICPA Professional Standards, op. cit.

[5] Fama, E. F., "The Behavior of Stock Market Prices," Journal of Business, (January, 1955), pp. 34-105.

in determining market risk. The implications of the securities market reaction to segment information must therefore be addressed. If the securities market distinguishes high quality segment information from low quality segment information, the FASB's position is affirmed and the high quality disclosures represent models which other firms should emulate. If there is a market reaction to the segmental disclosures, but not to the quality of disclosures, segmental data is new information the market and the FASB's position is also affirmed but the type of disclosure is immaterial. If the segmental disclosures do not cause market reactions by providing new information, the FASB's position of requiring the segmental data may be questioned, as the disclosures are not provided without a cost.

ANTICIPATED CONTRIBUTION OF THE STUDY

This study provides some evidence of the effect of segmental disclosures (as required by the FASB Statement Number 14) on the systematic risk associated with diversified firms. While segmental disclosure is not an absolute determinant of the systematic risk, it may be a factor. Moreover, empirical research has not dealt with the segmental disclosures based on FASB Statement Number 14. This study is the first to measure the significance of the segmental disclosures on the systematic risk of the firms which have been required to report segmental data under FASB Statement 14.

The study updates and substantiates several of the previous studies conducted under the SEC segmental disclosure rules. These previous studies indicated investors do react to the SEC segmental disclosures. Improvements in the previous research methodologies are included and discussed in Chapter 3.

OBJECTIVES OF THE STUDY

The main objective of this research is to examine the impact of segmental reporting disclosures on the securities market. Specifically, the objectives of the research study are:

1. To investigate whether the securities market reacts to segmental reporting disclosures in assessing the systematic risk of the diversified companies.

2. To update the previous studies on segmental reporting disclosures. For example, Kochanek[6] used 1966, 1967, 1968 and 1969 data. Singhvi and Desai[7] used 1965 and 1966 data. Horwitz and Kolodny[8] used 1969 data.

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[6]Kochanek, R., "Segmental Financial Disclosures and Security Prices," The Accounting Review, (April, 1974), pp. 254-258.

[7]Singhvi, Surendra and Harsha B. Desai, "An Empirical Analysis of the Quality of Corporate Financial Disclosure," The Accounting Review, (January, 1971), pp. 129-138.

[8]Horwitz, Bertrand and Richard Kolodny, "Line of Business Reporting and Security Prices: An Analysis of

Simonds and Collins[9] used 1967-1970 data. These previous studies did not look into the effect of FASB's Statement 14 issued in December, 1976 on segmental disclosure requirements. They investigated the effect of SEC segmental disclosure requirements by using SEC 10-K reports. Since the investing public (investors, financial analysts, creditors) often turn to the annual financial reports for information, a testable hypothesis is whether the impact of segmental disclosures in annual financial reports on the securities market will be significant.

SCOPE OF THE STUDY

To accomplish the purposes of this investigation, primary attention was given to the following areas:

1. The objectives and requirements of segmental reporting, based on FASB Statement Number 14.

2. The accounting variables that affect systematic risk in addition to quality of segmental disclosures.

3. The relationship between systematic risk and segmental disclosures.

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an SEC Disclosure Rule," The Bell Journal of Economics, Volume 8, Number 1, (Spring, 1977), pp. 234-249.

[9]Simonds, Richard R. and Daniel W. Collins, "Line of Business Reporting and Security Prices: An Analysis of an SEC Disclosure Rule: Comment," The Bell Journal of Economics, Volume 9, (Autumn, 1978), pp. 646-658.

4. Evaluation of the quality of segmental disclosures in annual reports based on FASB Statement Number 14 using an appropriate evaluation tool.

5. The use of statistical tools to examine risk associated with the firms and the quality of their disclosures.

PREVIEW OF THE PLAN OF INQUIRY

The investigation addresses systematic risk (market beta of firms) and the quality of segmental disclosures as enunciated by FASB Statement Number 14. The plan of inquiry takes the following pattern: Chapter one consists of the introduction, statement of the problem, the anticipated contributions of the study, the objectives of the study, the scope of the study, and the preview of the plan of inquiry. Chapter two reviews the literature related to the efficient market hypothesis and its relationship to the financial statement data. Also, evidence on segmental information based on empirical research is further discussed in this chapter. Chapter three consists of the methodology. Different statistical tools are used to examine the differences between the experimental and the control samples. The evaluation of annual reports and classification of the experimental group as the high-quality and the low-quality disclosure groups are discussed. In Chapter four the results and

analysis of findings are discussed. Chapter five con-consists of the summary, the conclusions, the limitations and the recommendations for further research. The next chapters present a review of the literature and relates the previous studies to the problem investigated.

Chapter 2

REVIEW OF PREVIOUS RESEARCH

The Effficient Market Hypothesis and Financial Statement Data

The reaction of the securities market to the financial statement data has been empirically investigated by many researchers. Fama[1] defines capital market efficiency as one in which market prices fully reflect all information at that time. Fama's work serves as a major foundation of much of the market related research. Ball and Brown[2] examined the capital market reaction to firms with positive earnings changes as compared to firms with negative earnings changes. They concluded that the securities market reacts to the annual income report. Beaver[3] studied the price and trading volume reaction to annual financial statement announcements, and his results substantially supported the Ball and Brown study.

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[1] Fama, E. F., "The Behavior of Stock Market Prices," Journal of Business, (January, 1955), pp. 34-105.

[2] Ball, R. and Brown, P., "An Empirical Evaluation of Accounting Income Numbers." Journal of Accounting Research, (Autumn, 1968), pp. 159-178.

[3] Beaver, W. H., "The Information Content of Annual Earnings Announcements." Empirical Research in

In addition, Chatlos[4], Dyckman et. al.[5], Foster[6], Beaver[7], Foster[8], Taylor[9], Patell[10], and Spangler[11] have provided support that the capital market react to publicly available information such as the annual financial reports.

Accounting: Selected Studies, 1968. Supplement to Journal of Accounting Research, (1968), pp. 67-92.

[4]Chatlos, R. J., "Inside Information and the Analyst." In S. N. Levine (ed.) Financial Analyst's Handbook 1-Portfolio Management, Irwin, Homewood, Illinois, 1976, pp. 74-86.

[5]Dyckman, Thomas, David H. Downes and Robert P. Magee, Efficient Capital Market and Accounting: A Critical Analysis: Prentice-Hall, Incorporated, Englewood Cliffs, New Jersey, 1975, pp. 5-7.

[6]Foster, George, Financial Statement Analysis, Prentice-Hall, Incorporated, Englewood Cliffs, New Jersey, 1978.

[7]Beaver, W. H., "What Should be the FASB's Objective?" The Journal of Accountancy, (August, 1973), pp. 49-56.

[8]Foster, George, "Quarterly Accounting Data: Time-Series Properties and Predictive Ability Results," The Accounting Review, (January, 1977), pp. 1-21.

[9]Taylor, R. G., "An Examination of the Evolution Content; Utility and Problems of Published Interim Reports," Unpublished Ph.D. Dissertation, University of Chicago, 1963.

[10]Patell, J. M., "Corporate Forecasts of Earnings per Share and Stock Price Behavior: Empirical Tests," Journal of Accounting Research, (Autumn, 1976), pp. 246-276.

[11]Spangler, C. W., "The Effects of Unanticipated Changes in Dividends on Security Returns," Unpublished Master of Science Thesis, M.I.T., Cambridge, Massachusetts, 1973.

The present investigation is based on the assumption of the semi-strong form of the efficient market, which states that the securities market reacts to publicly available financial statement data, which beginning in December, 1976 includes information as required by FASB Statement Number 14. The previous research supports the use of the efficient market assumption. That is, if segmental information is new data to the securities market, then the securities market provides a mechanism whereby the reaction to segmental disclosures can be evaluated. Of more importance to this proposition is whether the quality of disclosures play a vital role in the assessment of systematic risk. These two propositions have been tested.

The evidence of the previous research on the segmental information of the Securities and Exchange Commssion is discussed below.

The Kinney Study

Kinney[12] investigated the relative predictive ability of segment versus consolidated data in estimating future total-entity earnings of diversified companies. Kinney

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[12]Kinney, W. R., Jr., "Predicting Earnings: Entity versus Subentity Data," Journal of Accounting Research, (Spring, 1971), pp. 127-136.

analyzed twenty-six firms that disclosed segment revenue and profit data in their annual reports for 1968 and 1969. By using four expectation models, he found that segment-based predictions of 1968 and 1969 consolidated earnings had significantly smaller average absolute prediction errors than did predictions based on historical consolidated earnings figures. Kinney cautioned against generalization of the results, since there could be other reasons which made the diversified firms disclose their segmental data voluntarily and since the segmental reporting disclosures were not required at the time of his study.

The Collins Study

Collins[13] extended and updated the preliminary work of Kinney. Collins used data disclosed under the line-of-business reporting requirements of the SEC imposed in 1970. He identified ninety-six firms which provided segment revenue and profit data from 1967 through 1970 from 1970 Form 10-K reports. By using several times series models[14] Collins found that segmental-based procedures

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[13]Collins, Daniel W., "Predicting Earnings with Subentity Data: Some Further Evidence," Journal of Accounting Research, (Spring, 1976), pp. 163-177.

[14]For further discussion of the time series models used by Collins, see Journal of Accounting Research, Volume 14, (Spring, 1976), pp. 163-177.

appeared to out perform the consolidated-based methods in predicting levels of earnings. This result is consistent with Kinney's earlier findings. Collins concluded that:

> The predictive ability results presented in this study generally corroborate Kinney's earlier findings which were based on segment data voluntarily disclosed in the published annual reports. The evidence suggests the SEC product-line revenue and profit disclosures together with industry sales projections published in various government sources provide significantly more accurate estimates of future total-entity sales and earnings than those procedures that rely totally on consolidated data (p. 175).

The Singhvi and Desai Study

Singhvi and Desai[15] investigated the quality of corporate financial statement disclosures and related the quality to other characteristics of the firms. They randomly selected 100 listed companies and 55 unlisted corporations for fiscal years ending between April, 1965, and March 31, 1966, from the 500 largest U.S. industrial corporations included in the Fortune's 500 Directory of 1965. They used a systematic sampling procedure to select the annual reports of unlisted corporations from the National Over-the-Counter quotations of the 800 corporations published in the New York Times.

Singhvi and Desai evaluated the quality of corporate disclosures in the annual reports (between April, 1965

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[15] Singhvi and Desai, op. cit.

and March 31, 1966) by using an index of disclosure with thirty-four items. The items were taken from Cerf[16] who selected the items in the index on the basis of a study of the investment decision process, a review of the literature, interviews with security analysts, and an examination of analysts' reports. Weights were assigned to the items in order to note differences in their relative importance. The total weights given to all items equaled sixty-eight.

The quality of disclosure in annual reports was quantified by assigning disclosure scores for each item. The corporations were classified according to the total disclosure scores. A multivariate analysis was used to test the significance of the relationship between the quality of disclosure and various characteristics. It is important to note that Singhvi and Desai made the assumption that the quality of disclosure in annual reports is not by itself an independent variable; it is very likely to be influenced by several variables.

Their study focused on investigating a relationship between quality disclosure and asset size, number of

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[16]Cerf, Alan R., "Corporate Reporting and Investment Decisions," The University of California Press, 1961, pp. 25-27.

stockholders, listing status, CPA firms, rate of return, and earnings margin. Singhvi and Desai concluded that:

> Corporations which disclose inadequate information are likely to be: (a) small in size as measured by total assets, (b) small in size as measured by number of stockholders, (c) free from listing requirements, (d) audited by a small CPA firm, (e) less profitable as measured by rate of return, and (f) less profitable as measured by earnings margin.

They also concluded that:

> Inadequate corporate disclosure in annual reports is likely to widen fluctuations in the market price of a security since investment decisions, in the absence of adequate information, are based on less objective measures (p. 137).

The significance of the Singhvi and Desai study is that the quality of corporate disclosures could be evaluated, and that quality related to financial and market characteristics of the firm could be measured. A second major point is that the variables they related to the quality of disclosure must be held constant if differences in disclosure quality are to be studied. Therefore, in studying the market effect of difference in the quality of segmental disclosures, the effect of extraneous variables must be held constant.

The Kochanek Study

Kochanek[17] investigated the securities market reactions for diversified firms which have adopted

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[17]Kochanek, op. cit.

alternative segmental financial disclosure practices. He selected thirty-seven diversified December 31 fiscal year firms. The annual financial reports of the firms were obtained and surveyed for the years 1966, 1967, 1968 and 1969. A review of the literature by Kochanek revealed the types of segmental disclosures that were generally agreed upon by past researchers as useful to the investors and financial analysts. Kochanek divided the types of segmental disclosures into four levels: (1) descriptive, (2) segment sales, (3) segment income, (4) segment assets. He assigned an approximately equal number of possible points to each level so as not to give disproportionate consideration to a particular item of disclosure. Kochanek did not make any judgment as to whether or not segment earnings data, for instance, were proportionately more or less useful to investors than segment sales. Instead, the desirability of the presence of segmental data was measured in three degrees: none, partial, and satisfactory. A matrix description of the segmental reporting characteristics is presented in Table 2.1.

According to the results of the survey conducted by Kochanek, twenty-four firms out of thirty-seven firms disclosed at least the minimum desired amount of subentity detail consisting of complete segment descriptions and corresponding gross revenues. These

TABLE 2.1

Degree of Segmental Disclosure

Type of Segmental Disclosure	Assigned Weights: None	Partial	Satisfactory	Maximum Weights
Level 1, Description:				
1. List of Segments	0	1	2	2
2. Segment Description	0	1	2	2
3. Segment Companies	0	1	2	2
4. Segment Products	0	1	2	2
5. Future Segment Plans	0	1	2	2
6. New Acquisitions	0	1	2	2
				12
Level 2, Segment Sales:				
Tabular ($)	0	4	10	10
Chart of Graph	0	2	8	-
Correspond with Segment Description	0	1	2	2
				12
Level 3, Segment Income:				
Tabular ($)	0	4	10	10
Basis for Income Computation	0	-	2	2
				12
Level 4, Segment Assets:				
Segment Capital Expenditures	0	2	5	5
Segment Assets	0	2	5	5
				10

Continued on next page.

TABLE 2.1 continued

Degree of Segmental Disclosure

Type of Segmental Disclosure	Assigned Weights None	Partial	Satis-factory	Maximum Weights
Comparison of Data: (Sales & Income)				
1 year	0	-	1	
2 - 5 years	0	-	2	
6 years or longer	0	-	3	3
Maximum possible 1 year score				49
Maximum possible 4 year score (49X4)				196

Source: Kochanek, R. "Segmental Financial Disclosure and Security Prices," The Accounting Review, (April, 1974), p. 249.

twenty-four firms qualified as good reporters. Based on the results of his study, a score of 94 was the minimum cut-off point for good reporters. The survey scores ranged from a low of 20 to a high of 181, out of a possible 196 points. Six firms out of twenty-four good reporters were classified as superior reporters. The scores for these firms ranged from 166 to 181. Thirteen firms were classified as "poor" reporters. The scores of these firms ranged from 20 to 80.

The author presented four models to evaluate the relationship between segmental financial disclosure and earnings predictability. The four models were referred to as long term, January 1, 1969 to January 1, 1970; intermediate, January 1, 1970 to June, 1970; short term, July 1, 1970 to January 1, 1971; and current, January 1, 1971 to April, 1971. Kochanek stated that:

> The purpose of these models was to determine if firms disclosing subentity data had greater earnings predictability than firms not revealing such information. Earnings predictability was measured by correlations between changes in annual reported earnings per share figures and changes in stock prices computed over time periods which preceded (led), and succeeded (lagged) the earnings change observation year (p. 251).

The Kochanek study is significant in that he provided a mechanism for measuring the quality of segmental disclosures which has been modified and employed in this

study. His results suggest that there is a market response to the quality of segmental disclosures. By providing more control of extraneous variables, the market reaction to the quality of segmental disclosures may be more clearly identified. The Kochanek study provides a major basis for the study reported in later chapters. Kochanek's results suggest that segmental disclosure results aid investors in anticipating future earnings changes in the valuation of securities. The stock market reactions to current earnings announcements would be stronger for poor reporters than for good reporters. Also, his results indicated that in the absence of segmental information, the investors reacted more to current information sources, such as new releases and quarterly earnings announcements. In conclusion, the hypothesis that sample firms with good segmental disclosure would exhibit the same distribution of computed weekly stock price variability ratios as firms with poor segmental disclosure was rejected. Kochanek cautioned against possible bias because he did not control extraneous variables which may have affected his results.

The Beston Study

Contrary to the studies discussed above, Beston[18] examined the effect of the disclosure requirements of

[18]Beston, G., "Required Disclosure and the Stock Market: An Evaluation of the Securities Exchange Act of

the SEC Act of 1934. He examined the effects of the required disclosure of sales, since analysts considered sales very important. By using a risk-return linear model, he concluded that there was no measurable effect between the residuals of the companies that did or did not disclose their sales. He further stated that disclosure of sales figures would not add any information to the financial statements once profit is known.

The Horwitz and Kolodny Study

A study made by Horwitz and Kolodny[19] examined the impact of line-of-business reporting required by the SEC in 1970, on the securities market. By using the capital asset pricing model, Horwitz and Kolodny selected two samples - one experimental group (the line-of-business reporting sample) called LOBUR sample, and the control group (the non-line-of-business reporting sample) called non-LOBUR. One hundred firms were randomly selected. Fifty LOBUR firms which provided segmental data in their 1969 annual reports were selected from 1969 edition of Accounting Trends and Techniques. The fifty non-LOBUR firms were selected from the SEC reports. Data on the two samples were taken from the COMPUSTAT Price

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1934," The American Economic Review, Volume 63, Number 1, (March, 1973), pp. 132-155.

[19]Howritz and Kolodny, op. cit.

Dividends Earnings file. A time period of nine years was divided into three subperiods:

(1) 1965-1970 period - this is the period before the change in the reporting requirement (pre-disclosure period);

(2) 1971 period - the one-year period surrounding the time in which the change in the reporting requirement took effect (disclosure period), and

(3) 1972-1973 period - two-year period, following the change in the reporting requirement (post disclosure).

By using the market model, $\tilde{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i \tilde{R}_{mt} + \tilde{\mu}_{it}$, Horwitz and Kolodny evaluated whether shifts in perceived market risk as measured by beta during the disclosure period were significantly greater for LOBUR firms than for non-LOBUR firms. By estimating the average absolute beta for the three periods indicated, they concluded that shifts in market risk around the time of disclosure were no greater for LOBUR firms than for non-LOBUR firms. The authors further concluded that shifts in market risk provide no evidence that LOBUR information affected the level of market risk perceived by the investors.

The authors further measured the unexpected returns that were realized on the securities of the LOBUR firms close to the time that the additional information was

disclosed. Specifically, the issue was whether the newly discovered line-of-business data led to a reassessment of value of reporting firms by investors. The results of the residual analysis provided no evidence that LOBUR reporting affected security prices.

Even though the Horwitz and Kolodny study suggested that there was no market reaction to segmental data as required by the SEC, an investigation of the market effect of the FASB's segmental disclosures is still warranted. The FASB's disclosure requirements are more extensive than the SEC's requirements which Horwitz and Kolodny studied.

The Simonds and Collins Study

Simonds and Collins[20] also investigated the risk-information effects of LOBUR disclosure. Their study was divided into two parts. The first part replicated the Horwitz and Kolodny study; the second part examined the movement of BETA Coefficients from April, 1968 to December, 1974. Simonds and Collins identified LOBUR firms as those having segmental disclosures in annual reports registration statements, or proxy statements issued prior to filing of their 1970 10-K reports with the SEC. The types of segmental disclosure by individual firms in their 1967-1970 annual reports were

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[20]Simonds and Collins, op. cit.

obtained from Accounting Trends and Techniques. The monthly return data on the CRSP tapes for the time period of October, 1965 through July, 1974 were obtained for 215 firms. These firms were classified into three groups. The first group was called Multisegment Treatment Group (MST). It consisted of 78 firms. The MST group provided the most extensive segmental disclosures. The second group, Multisegment Control Group (MCG) consisted of 70 firms. Those firms that had no or limited segmental disclosure (segment revenue disclosure only) in the annual reports, prospectus, or proxy statements in the period 1967-1970 prior to initiation of SEC LOBUR in the 1970 10-K. The third group was called the Single-Segment Control Group (SSC) which consisted of 67 firms. The characteristic of this group was that the firms did not have segmental disclosure either before or after initiation of SEC LOBUR in the 1970 10-K. The firms in each group were identified by three-digit Standard Industrial Classification Codes (SIC).

The focus of this study was to compare relative changes in beta (from pre-LOBUR to post-LOBUR) for treatment versus control groups. By using the market model, Simonds and Collins calculated moving-beta estimates (B_{iT}) for each of the three groups. The results of the tests indicated a significant downward drift in the beta level

of the multi-segment treatment group with the most dramatic shift occurring within the designated critical period, which is eight months after the initiation of the SEC LOBUR reporting for registration statements and twelve months before the initial disclosure of LOBUR data in the 1970 10-K reports. On the other hand, the average betas of the multi-segment and single-segment control groups indicated considerable stability overall with little change within the designated critical period.

The authors investigated the observed beta changes for each of the three groups by using the analysis of covariance (ANCOVA) procedure. The results of the ANCOVA tests strongly confirmed the previous result that the multi-segment treatment group portfolio (MST) experienced a significant shift in beta while the Multi-segment control group (MSC) and single-segment control group (SSC) indicated no significant beta change during the designated critical period. The authors concluded that:

> The fact that the beta change for the MST portfolio appears to have occurred before March, 1971, suggest that SEC LOBUR data were being developed and disseminated to the market well in advance of the time that such data were published as part of the registrant's 1970 10-K reports (p. 653).[21]

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21 Ibid.

Using the Horwitz and Kolodny procedures and comparing MST and MSC or MST and SSC, the authors did not reject the null hypothesis of no difference between the treatment group and the control group. Neither was it rejected when they used the standard F-test for equality of variances. However, the authors pointed out that if the t-tests were conducted using the raw beta changes, significant test statistics would have been obtained.

Generally the above studies, with the exception of Horwitz and Kolodny, support the assumption that the securities market reacts to segmental disclosure required by the Securities and Exchange Commission (SEC). Also, research shows that sub-entity financial statements are better predictors of future earnings than the consolidated earnings. The majority of the above studies empirically support the proposition that segmental disclosures are important to investors and provide a foundation for this study.

THE RELATIONSHIP OF THE PREVIOUS STUDIES TO THE PRESENT STUDY

As mentioned above, the variables mentioned by Singhvi and Desai[22] were used in this study as the

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[22] Singhvi and Desai, op. cit.

discriminating variables among others to examine the differences between the quality of disclosures based on the firms' financial attributes.[23] Samples in the Kochanek[24] study lacked homogeneity. He did not control or attempt to extract the extraneous variables in order to achieve homogeneity of the sample. Also, Horwitz and Kolodny,[25] Beston[26] studies did not have a control group or did not attempt to control for extraneous variables. Simonds and Collins[27] study is superior to the others in that they included treatment and the control groups, although control and treatment groups were not sufficient to suppres the influence of extraneous variables. Other procedures can be used to further remove effects of extraneous variables.

One of the main motivations of this investigation was to use different statistical tools to control or eliminate extraneous or confounding variables that may make the results or findings of any empirical research suspect. The first step in controlling for the

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[23] A detailed discussion on the financial attributes can be found on page 57.

[24] Kochanek, op. cit.

[25] Horwitz and Kolodny, op. cit.

[26] Beston, op. cit.

[27] Simonds and Collins, op. cit.

extraneous variable was to carefully select the experimental sample firms. The major point of investigation is that if any difference in systematic risk does occur because of the quality of segmental disclosure, it should be the effect of differences in segmental disclosure. Measures of control were imposed on the experimental group by examining whether the firms in the group were homogenous across attributes other than segmental disclosures. The previous studies discussed above did not use the measures employed in this study to control for the extraneous variables. The next chapter discusses in detail the methodology used in this study and the measures employed to control extraneous effects.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

This chapter describes the research methodology employed in the study. The first section discusses the research sample and its characteristics. The second section presents the significance of the systematic risk and its relationship to accounting variables. The third section discusses the statistical methods employed in this study. The fourth section presents the evaluation design. The final section discusses the methodology used to extract extraneous variables.

The Research Sample

Three hundred diversified companies were selected from the Value-Line tape and Investment Survey Records of 1978. The companies selected had the following characteristics:

(1) total assets must be equal to or greater than $500 million,

(2) the rates of return (Net Earnings/Total Investment) must be five percent and above, and

(3) the earnings margin must be three percent or more.

These criteria represent one method used to achieve homogeneity among the diversified firms so as to control the effect of these variables on the systematic risk.

One hundred and fifty diversified companies of the three hundred firms reported segmental data in their 1978 annual reports as required by the FASB Statement Number 14. They represent the experimental group. The remaining one hundred and fifty firms reported only consolidated statements in their 1978 annual reports. These firms did not meet the FASB Statement Number 14 requirements in 1978 and as such were not required to report segmental disclosures. The one hundred and fifty non-segmental reporting firms comprise the control group (See Appendix C).

The main purpose of having a control group is to find the difference in the systematic risk of the diversified firms that reported segmental data and those diversified firms that were not required to report segmental data. A priori reasoning would suggest that the more information a firm disseminates about the operating performances of its segments, the lower will be the systematic risk of the firm, all other factors being equal. Kinney[1] indirectly supported this hypothesis by reporting that segment-based predictions of consolidated earnings

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[1] Kinney, W. R., op. cit.

had significantly smaller average absolute prediction errors than did predictions based on historical consolidated earnings figures. Other evidence that supported this assertion was provided by Collins.[2] He found that segmental-based procedures appeared to dominate the consolidated-based procedures in predicting levels of earnings.

Simonds and Collins[3] empirically assessed the risk-information effects of Line-of-Business disclosures by testing three groups: Multisegment Treatment Group, Multisegment Control Group and Single-Segment Control Group. The authors compared relative changes in beta (from pre-LOBUR to post-LOBUR) for treatment versus control groups. The results of their tests indicated a significant downward drift in the beta level of the Multisegment Treatment Group with the most dramatic shift occurring within the designated critical period - the disclosure period.

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[2]Collins, D. W., op. cit.

[3]For further study on Simonds and Collins, see Chapter 2.

SYSTEMATIC RISK (MARKET BETA)

The measure of systematic risk used in the study is the systematic risk (the market beta) from the traditional market model, $\tilde{R}_{it} = \hat{\alpha}_i + \hat{\beta}_i \tilde{R}_{mt} + \tilde{J}_{it}$. R_{it} is the return on security i in period t. R_m is the return on the market portfolio in period t. The market betas for the three hundred companies were taken from the Value Line tapes. By definition, market beta is expressed as follows:

$$\beta^m = \frac{Cov(R_i, R_m)}{Var(R_m)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where β^m is the systematic risk. $Cov(R_i, R_m)$ is the covariance of the individual return of a firm in time t and the market return in time t; $Var(R_m)$ is the variance of the market return in time t.

The Value Line[4] betas are derived from a least-squares regression analysis between weekly percent changes in the price of stock and weekly percent changes

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[4] Value-Line User's Manual, 1978 Edition, Chapter 7, page 18.

in the New York Stock Exchange Composite Index over a period of five years.[5]

The betas in the Value Line base are adjusted for non-stationarity. Since high beta stocks may decrease over time, and low beta stocks may increase over time, the adjustment for nonstationarity of the calculated market betas is important. The adjustment for nonstationarity of beta is necessary so that changes in beta that are investigated are due to real economic events and not to general upward or downward trends in the beta itself. Since the investor is interested in the expected risk of his portfolio over a time period, it is important to examine the stability of beta over time.

Sharpe and Cooper[6] examined this issue by estimating the betas of securities for each year from 1931 to 1969. The data were collected from the CRSP file. The betas in each year were ranked from highest to lowest and placed in ten risk-return classes. The first risk-return class comprised those securities with the highest estimated betas over the past 60 months. This procedure was repeated each year. The authors then computed the percentage of stocks remaining in the same

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[5]The Five-year period is from 1973 to 1978.

[6]Sharpe, W. F., and Cooper, G. M., "Risk-Return Classes of New York Stock Exchange Common Stocks, 1931 to 1969," Financial Analysts Journal, (March-April, 1972), pp. 46-54.

risk-return class in adjacent one-year and five-year periods. If the relative rankings of betas were stable over time, each firm would remain in the same risk-return class. They found that there is more instability in adjacent five-year rankings of beta than in adjacent one-year periods. The results obtained suggest that at the individual security level, there is nontrivial instability in estimated betas over time. Beaver et. al.[7] also concluded that there is considerably more stability in the estimated betas of portfolios over time. They reported that the Spearman Rank Corporation between adjacent betas of 307 NYSE stocks for the 1947-1956 and 1957-1965 periods were .626 at the individual security level, .875 at the 5-security portfolio level, and .989 at the 20-security portfolio level.

Beaver and Manegold[8] examined the association between market-determined and accounting-determined risk measures. They estimated the security market beta for

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[7]Beaver, et. al., "The Association Between Market Determined and Accounting Determined Risk Measures." The Accounting Review, (October, 1970), p. 669.

[8]Beaver, W. H., and Manegold, J., "The Association Between Market Determined and Accounting Determined Measures of Systematic Risk: Some Further Evidence." Journal of Financial and Quantitative Analysis, (June, 1975), pp. 231-284.

254 firms from the monthly returns over the 1951-1969 period. The Spearman Rank Correlations for the net income/total assets and net income/net worth were separately examined. The Spearman Rank Correlations between the securities market beta and each of the accounting variables are presented in Table 3.1.

TABLE 3.1

The Relationship Between the Securities Market Beta and the Accounting Variables

	Single-security level	Five-security level	Ten-security portfolio level
Net Income / Total Assets	.41	.60	.69
Net Income / Net Worth	.46	.69	.74

The authors concluded that there is a strong significant association between the securities market and the accounting based estimates of beta. The Ball and Brown study[9] supported the above results. Ball and Brown used the Spearman Rank Correlation to find a relationship between

[9] Ball and Brown, op. cit.

securities market beta and operating income, net income and net income available for common stocks, respectively. The results indicated a significant correlation between securities market and accounting-based estimates of beta.

In summary, previous research has demonstrated a significant empirical relationship between a firm's systematic risk and certain accounting variables discussed on the previous page. Based on previous research, investigating the relationship of the systematic risk with accounting information (i.e. disclosure of segment data) is appropriate.

Since the three hundred diversified firms were divided into an experimental group with segmental disclosures and a control group without segmental disclosures, the first problem investigated was the difference in systematic risk between the two groups. That is, does the disclosure of segmental information itself affect systematic risk?

The Kolmogorov-Smirnov two-sample test was conducted to test the difference between the cumulative distributions of the betas of the experimental and the control groups. Also, a t-test statistic was conducted to examine the differences between the mean betas of the two samples.

THE RESEARCH DESIGN

The Kolmogorov-Smirnov Two-Sample Test

The main focus of this section is to examine the relationship between the experimental and the control groups. To conduct this test, the non-parametric Kolmogorov-Smirnov two-sample test was used to test the null hypothesis that two independent samples were drawn from the same population or from a population with the same distribution. A two-tail test was used to test the sensitivity of the difference in the distributions from which the two samples were drawn (i.e., differences in location, central tendency, in dispersion, or in skewness). If the two samples have been drawn from the same population, the cumulative distributions of both samples are expected to be close to each other because both samples will be showing only random deviations from the population distribution. If the two-sample cumulative distributions are significantly different at any point, the two samples come from different populations. Thus, significant deviation between the two-sample cumulative distributions will reject the null hypothesis.[10]

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[10] Seigel, Nonparametric Statistics for the Behavioral Sciences, McGraw-Hill in Psychology, New York, Toronto, London, 1956.

Testing Procedures

To apply this test, a cumulative frequency distribution for each sample of observations (control and experimental) was made by using the same intervals for both distributions. For each interval, one step was subtracted from the other, the result is the deviation, which is called "D". The test focused on the largest of these observed deviations (D's). For example, D = Maximum $S_{n1}(X)-S_{n2}(x)$[11] where D is the deviation in each observation, $S_{n1}(X)$ is the observed cumulative step function of group one, and $S_{n2}(x)$ is the observed cumulative step function of group two.

The systematic risk is the observed variable. The interval between the lowest and the highest risk measure of market beta for the experimental and the control groups was 0.55 and 1.80. The two-sample beta intervals were divided into six intervals: (1) 0.55 to 0.86, (2) 0.87 to 0.97, (3) 0.98 to 1.18, (4) 1.19 to 1.39, (5) 1.40 to 1.60, and (6) 0.61 to 1.80. The blocking is based on the frequency of distributions in both samples so as to have a representative number of subjects in each cell.

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[11] Ibid.

Student's t-test

In addition to the non-parametric test mentioned on the previous page, a student's t-test was conducted in calculating the probability associated with the null hypothesis that the experimental group has the same beta mean as the control group. The t-test is a statistic generally applicable to a normally distributed random variable where the mean is assumed to be known and the population variance is estimated from a sample. The t-test provides the probability levels for testing the significance of the difference between two-sample means.

The investigator has not made any assumption as to the normality of the sample distribution in this study; but it is appropriate to test for the difference in the means of the two groups by using a parametric statistic so as to compare the results obtained with those of the non-parametric statistics discussed earlier. The results of the Kolmogorov-Smirnov test and the t-test for the experimental and the control groups are discussed in Chapter 4.

EVALUATION OF ANNUAL REPORTS DESIGN

Since the primary purpose of the study was to examine whether or not the securities market reacts to the quality of segmental disclosures of diversified firms, a

sixteen-item evaluation design was used to evaluate the quality of segmental disclosures in the 1978 annual financial reports of the experimental sample. The sixteen items incorporate the SEC's segmental disclosure rule, and more importantly, the segmental disclosure requirements of FASB Statement Number 14. The items indicate the opinions of financial analysts and the items analysts would like to be disclosed in the annual financial reports.[12]

A review of the literature and the substance of the FASB Statement Number 14, revealed the type of segmental disclosures that have been discussed by past researchers as useful to investors and financial analysts. The types of segmental disclosures were divided into four categories:

(1) general description of segmental units;

(2) segment sales and expenses;

(3) segment income (losses) and the tax effect on income (losses); and

(4) segment assets.

Points were assigned to the items in each category based

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[12]Bradish, Richard D., "Corporate Reporting and the Financial Analysts," The Accounting Review, (October, 1965), pp. 757-765.

on their importance to investors, i.e., high quality, medium quality, and low quality.

Each item in category one carries equal points. The high quality point is 3, the medium quality point is 2, and the low quality point is 1. In categories two, three and four, each item carries different points. The points assigned to each item depend on the relative importance of the item to the investors. The high quality points are from 4 to 10. The medium quality points are from 2 to 8. The low quality points are from 1 to 4. Kochanek[13] and Singhvi and Desai[14] used a similar methodology. The matrix description of the segmental disclosure categories is presented in Table 3.2.

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[13]Kochanek, op. cit.

[14]Singhvi and Desai, op. cit.

TABLE 3.2

Degree of Segmental Disclosure

TYPE OF SEGMENTAL DISCLOSURES	WEIGHTS HIGH	MEDIUM	LOW	MAXIMUM WEIGHTS
CATEGORY 1, GENERAL DESCRIPTION				
(1) List of unaffiliated customers	3	2	1	3
(2) List of segment companies	3	2	1	3
(3) List of geographic areas	3	2	1	3
(4) Segment products	3	2	1	3
(5) Type of industries in the multisegment	3	2	1	3
(6) Segment information presented in percentages	3	2	1	3
				18
CATEGORY 2, SEGMENT SALES AND EXPENSES				
(7) In tabular form, 3 yrs., 2 yrs., 1 yr.	10	8	4	10
(8) In chart or graph, 3 yrs., 2 yrs., 1 yr.	8	6	2	8
(9) In notes to financial statements	4	2	1	4
				22

Continued on next page

TABLE 3.2 continued

Degree of Segmental Disclosure

TYPE OF SEGMENTAL DISCLOSURES	WEIGHTS HIGH	MEDIUM	LOW	MAXIMUM WEIGHTS
CATEGORY 3, SEGMENT INCOME (LOSS) AND TAX EFFECT				
(10) In tabular form	10	8	4	10
(11) In chart or graph	8	6	2	8
(12) In notes to financial statements	4	2	1	4
				22
CATEGORY 4, SEGMENT ASSETS AND LIABILITIES				
(13) Assets presented for 3 yrs., 2 yrs., 1 6r.	10	8	4	10
(14) Capital expenditures for 3 yrs., 2 yrs., 1 yr.	8	6	2	8
(15) Liabilities for 3 yrs., 2 yrs., 1 yr.	6	3	2	6
(16) Foreign operations for 3 yrs., 2 yrs., 1 yr.	4	3	1	4
				28
TOTAL MAXIMUM POSSIBLE SCORE				90

In this study, a high quality score of 90 is the maximum points a firm could obtain on all the items in the evaluation design. For example, a score of 61 indicates a partial disclosure of the items listed in the evaluation design, but not presented as fully as those firms with higher scores. A score of 29 indicates that the firm partially disclosed segmental data but the disclosure is not sufficient to provide a basis for meaningful interpretations about the operative performance of each segment in the diversified firm.

A disclosure score was calculated by dividing the points earned by an individual firm by the maximum points available. The maximum score a firm could obtain is one hundred percent. For example, if a firm obtains a score of 72 out of the maximum score of 90, the firm obtains an 80% (72/90) score. This calculation was used for all the firms in the experimental sample. The highest percentage score was 96%. The lowest percentage score was 32%. The sample was divided into two equal sized groups (the high quality disclosure and the low quality disclosure groups) based on the range of the scores between ninety-six percent and thirty-two percent (detailed results of the evaluation of the annual financial reports can be found in Chapter 4). The high quality and low quality groups provided the basis for evaluating the effect on systematic risk of differences in the quality of disclosures.

STANDARD INDUSTRIAL CLASSIFICATION CODE SCORING SYSTEM

The evaluation design discussed above is subject to possible bias in that it reflects the judgment of the author as well as other researchers. Kochanek[15] used a similar design and his results indicated that the design was capturing significant information on the quality of segmental disclosures. Nevertheless, because the design is judgmental, additional support was sought to prove that the design would capture significant differences in the quality of segmental disclosures. This additional support was in the form of a comparison of a Standard Industrial Classification (SIC) Code Scoring procedure with the disclosure scores derived from the evaluation design.

FASB Statement Number 14 on the segment information stated that statement users with segmental data can better appraise a corporation's past performance, future prospects, and risks than is possible using total enterprise data.[16] Hawkins suggested that in grouping products or services to form reportable segments, the

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[15] Kochanek, op. cit.

[16] AICPA Professional Standards, op. cit.

Standard Industrial Classification system and/or the Enterprise Standard Industrial Classification system may be useful.[17]

If firms reported segments identified, using the SIC code system, the number of segments reported in the annual reports, they should parallel the number of different industries (SIC code groups) in which the firm operates. Therefore, if a firm does not report as many segments as different industries in which it operates, the firm may be a low quality reporting firm. If the disclosure scores and the SIC scores are consistent statistically, the disclosure score is capturing the information it is supposed to measure, i.e., differences in disclosure quality.

The SIC code system defines industries in accordance with the composition and structure of the economy and covers the entire field of economic activities. The Executive Office of the President - Office of Management and Budget lists the general principles in preparing the classification of industries into different SIC code groups. They are:

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[17] Hawkins, David, F., Corporate Financial Reporting, Richard D. Irwin, Incorporated, Homewood, Illinois, 1977, p. 689.

(1) the classification must conform to the existing structure of the American industry;

(2) each establishment must be classified according to its primary or dominant activity; and

(3) to be recognized as an industry, the group of establishments consisting the proposed classification must be statistically significant in the number of persons employed, the volume of business done and other measures of economic activity.[18]

SIC codes based on a two-digit, three-digit, and four-digit level have been developing according to the degree of homogeneity of industrial activity among firms. The assignment of an industry code to each establishment is based on its primary activity, which is determined by its principal product or group of products, produced or distributed, or services rendered. The difference between the four-digit code and the three-digit code or the two-digit code is the homogeneity of the activity in the four-digit category. A four-digit code has greater homogeneity of activities within the category than the three-digit code category. A three-digit code has more homogeneity of industrial activity than the two-digit code group. A two-digit code is the least homogeneous

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[18] Executive Office of the President - Office of Management and Budget, Standard Industrial Classification Manual, 1972, p. 9.

primary activity group. The number of four-digit codes, three-digit codes and two-digit codes, respectively, were obtained for each sample firm from the Dun and Bradstreet One Million Dollar Directory, 1978 Edition (See Appendix A).

The number of the three levels of SIC codes provide information as to the number of different types of industrial activities conducted by each firm. For instance, a firm with five four-digit codes which operates in five industries (according to a four-digit classification code) may have fewer industries according to a three-digit or a two-digit classification.

A company may use a four-digit code, a three-digit code or a two-digit code system in subdividing the firm for purposes of reporting segment information in the annual reports. The firm that uses a four-digit code system in classifying its industries into different segments, reports more detailed segment information than the firm that uses three-digits or two-digits to determine segments.

The investigator obtained the number of segments disclosed by each firm from the 1978 annual reports. SIC code scores were calculated by dividing the number of reported segments by the number of the three levels of SIC codes (a four-digit code, a three-digit code and

a two-digit code). For example, if a company has five four-digit codes, four three-digit codes, and three two-digit codes, respectively, and reports four segments in the annual reports, the SIC code scores for this firm are:

(1) a four-digit code score of 80% (4/5),

(2) a three-digit code score of 100% (4/4), and

(3) a two-digit code score of 133% (4/3).

A company that has five industries according to the four-digit codes, but reports four industries in the annual reports, will obtain a lower score than a company which has four industries according to the four-digit codes and reports four industries in the annual reports.

Appendix A reports the numbers of the different SIC code groupings and the scores obtained by dividing the number of segments by the number of the SIC codes for each firm for each level (four-digit, three-digit and two-digit, respectively). Appendix A also shows the market beta (systematic risk) for each firm, and the number of segments reported in the annual reports.

In finding a relationship between the disclosure scores and each of the SIC code scores presented in Appendix A, a Spearman Rank Corporation test was conducted to examine whether or not the two scores are statistically correlated. The procedure for this test is discussed on the following page.

Spearman Rank Correlation Test

Spearman Rank Correlation is a measure of the relationship between two or more variables. The purpose of this test was to find whether or not disclosure scores (called Q4) as measured by evaluating the segmental disclosures in the annual reports is correlated with SIC code scores for four-digits, three-digits, and two-digits, respectively. If the relation between the two sets of scores are perfect, then the deviation between the two sets of scores will be zero. The larger the deviations, the less perfect will be the correlation between the two variables. The deviation was statistically calculated by finding the difference between the segmental disclosure score for each firm and its four-digit code score, three-digit code score and two-digit code score, respectively. The result was squared to remove the negative signs. The deviation which is presented by d_i was computed as follows:

$d_i = X_i - Y_i$ .....(2), where,

X_i = SIC code score for four-digit, three-digit or two digit SIC codes.

Y_i = Disclosure score obtained from the annual reports evaluation.

d_i = The difference of the two variables.

The formula for the Spearman Rank Correlation[19] is as follows:

$$r_s = 1 - \frac{6 \sum_{N^3-N}^{N} d_i^2}{} \quad \text{.....(3)}$$

The Statistical Analysts System (SAS)[20] procedure was used to compute the Spearman Rank Correlation Coefficients for each of the three SIC code scores. The design was as follows:

	SIC CODE SCORES
Disclosure scores obtained from the annual reports evaluation.	Four-digit code scores
	Three-digit code scores
	Two-digit code scores

[19] Seigel, Non-parametric Statistics for the Behavioral Sciences, McGraw-Hill Series in Psychology, New York, Toronto, London, 1956, pp. 127-28.

[20] Statistical Analysts System, User's Manual, North Carolina, 1971, p. 200.

ANALYSIS OF THE DISCLOSURE SCORES

Analysis of Variance Procedure

The disclosure scores were used to divide the experimental group into the high quality disclosure group and the low quality disclosure group based on the results of the annual reports evaluation. The median disclosure score was used to divide the experimental sample into two groups. The firms with the disclosure scores from 70% to 96% were classified as the high quality disclosure group, and those with the disclosure scores from 32% and 69% were classified as the low quality disclosure group.

Each group was tested for homogeneity of the disclosure scores. A one-way Analysis of Variance procedure was applied. The one-way ANOVA is based on the realization that there are two ways to calculate the population variance from sample data. Since there are two ways to estimate the same variance, the value for the F ratio formed by the two estimates will vary from one, by chance alone, if the data came from one population with a mean and variance of μ and σ^2. If however, the sample data came from populations which have different means and a common variance, the F ratio formed by the two variance estimates will tend to be greater than one, indicating

more than one population.[21] The results of this test can be found in Chapter 4.

Multiple Discriminant Analysis

While the sample observations have been divided into two groups based on disclosure quality, other variables may affect the systematic risk of firms. Systematic risk may be affected by the size of assets, liquidity, cash-flow, price/earnings ratio, dividend yield, earnings to net worth, earnings margin, leverage and rate of return. If this is the case, the sample may suffer from lack of precision and weaknesses identified in the previous studies. To be confident that the sample was homogeneous and that the influences of extraneous variables did not bias this investigation, financial variables of the two groups other than the quality of segmental disclosures were tested for significance differences.

The purpose of dividing the diversified firms into two groups according to the quality of segmental disclosures is to investigate whether high quality firms have lower systematic risk than the low quality firms.

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[21] Cangelosi, V. E., Phillip H. Taylor, Philip F. Rice, Basic Statistics: A Real World Approach, West Publishing Company, St. Paul, New York, Los Angeles, San Francisco, Boston, 1976, p. 165.

Many factors may contribute to the systematic risk of the firms. Among these factors are various financial variables. There is considerable evidence that supports the assertion that financial ratios are related to the systematic risk of firms. Previous research has indicated the following financial variables affect the systematic risk (Market beta): (1) Current Assets/current liabilities, (2) Size, (3) Cashflow per share, (4) Price/Earnings, (5) Divident yield, (6) Divident payout, (7) Earnings to Net Worth, (8) Earnings to net capital expenditures, (9) Leverage, (10) Earnings margin, (11) Taxes to Net Profit, and (12) Growth in earnings.[22]

These financial variables were taken from the Value Line Survey Records, 1978 Edition. The definitions of the variables are presented in Table 3.3 on the next page (See also Appendix B for detailed presentation).

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[22] Foster, George, op. cit.

TABLE 3.3

Definition of Financial Variables

	Symbol	Genetic names and definitions
1.	LQ	CA/CL is the current assets divided by current liabilities.
2.	SZ	Size is measured by the total sales.
3.	CH	Cashflow per share is the Net Cashflow divided by the common stock at the end of the year.
4.	PE	Price/Earnings is the price per share divided by the earnings per share.
5.	DY	Dividend yield is the dividend per share divided by price per share.
6.	DV	Divident payout is the divident per share divided by earnings per share.
7.	EN	Earnings to Net Worth is the net earnings divided by Net Worth.
8.	EC	Earnings to Net Capital Expenditures is the earnings divided by Net Capital expenditures.
9.	LV	Leverage is total long-term debts divided by equity.
10.	EM	Earnings margin is the net income divided by the total investment.
11.	TX	Taxes to net profit is the total amount of taxes paid divided by net profit.
12.	EG	Growth in earnings is the annual growth rate in EPS for five years compounded.

An appropriate statistical approach to examine if two or more groups are homogenous on multiple variables is the Multiple Discriminant Analysis (MDA). The main objective of using MDA is to investigate whether the high quality group and the low quality group are different on the above financial variables.

MDA was employed to determine and identify which discriminant (Predictor) variables exhibit significant differences between the high and the low quality disclosure groups. The twelve financial variables discussed above served as predictor variables (X_j) to calculate a linear combination of those predictor variables that maximally differentiated the two groups of firms. The linear combination (Y) was expressed as a function of the predictor variables (X_j) and a set of combining weights (V_j):

$$Y = \sum_{J=1,12}^{n} (V_j)(X_j) \qquad \begin{array}{l} n = 1 \ldots\ldots 75 \\ n = 1 \ldots\ldots 75 \end{array} \quad \ldots\ldots(4)$$

Total	150

Discriminant analysis identifies the maximum separation between groups by forming one or more linear combinations of discriminating variables. The discriminant function is presented as follows:

$$D_i = di_1Z_1 + di_2Z_2 + \ldots\ldots\ldots + di_pZ_p \ldots\ldots\ldots(5)$$

D_i is the score on discriminant function i, and d's are weighting coefficients, and the Z's are the standard values of the P discriminating variables used in the analysis. The discriminant criterion (λ) is a function of the variances between and within groups:

$$\lambda = \frac{\text{Sums of squares between (b) groups}}{\text{Sums of squares within (w) groups}} \quad \ldots\ldots\ldots (6)$$

Also, this equation can be expressed as the sums of squares and cross products matrices (SSCP) and the combining weight matrices (V):

$$\lambda = \frac{V'SSCP_b V}{V'SSCP_w V} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

The Statistical Package for Social Sciences (SPSS) computer procedure was employed for this statistical test. SPSS performs discriminant analysis either by entering all discriminating variables directly into the analysis (DIRECT METHOD) or through a stepwise method. This method selects the best set of discriminating variables. The criterion for controlling the stepwise selection in this study was the minimum "MAHALANOBIS" distance between groups. The

largest minimum F between groups is the largest increase in average multiple correlation.[23]

If the MDA test results indicate that the two groups are similar based on their financial characteristics, the only difference between the two groups is the quality of disclosures. However, if the test results indicate that the two groups are different on the financial variables used in the MDA, financial variables may play a part in dividing the sample into high quality and low quality groups. If this is the case, the associations between the financial variables (that entered the discriminant function) and the systematic risk (Market beta) must be investigated so as to know the effect of these variables on the systematic risk. If the correlation between the financial variables (that entered the discriminant function) is low, their effect on the systematic risk will be low. Their ability to separate the two groups into high quality and low quality groups will be minimal.

Two statistical approaches were employed to examine the correlation between the financial variables (used in

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[23]Nie et. al., Statistical Package for Social Sciences, New York, 1975, p. 435.

the MDA test) and the systematic risk. The first approach employed the Stepwise Multiple Regression Analysis and the second approach employed the Spearman Rank Correlation. Both statistical approaches are discussed below.

Stepwise Multiple Regression Analysis

In order to be confident that the financial variables that enter the discriminant function of the Multiple Discriminant Analysis did not pose any problem to the homogeneity of the two groups; a Stepwise Multiple Regression test was conducted. The betas of the experimental group were identified as the dependent variables and the twelve financial variables used in the MDA were identified as the independent variables. The purpose of this test was to enable the investigator to study the linear relationship between a set of independent variables (financial variables) and a dependent variable (systematic risk). The basic goal of multiple regression is to produce a linear combination of independent variables which correlate as highly as possible with the dependent variable.

Spearman Rank Correlation

The Spearman Rank Correlation test was also conducted to find the relationship between beta and each of the twelve financial variables. Detailed discussion of

the Sprearman Rank Correlation test can be found on page 52. The results are presented in Chapter 4.

STATISTICAL TESTS COMPARING THE HIGH QUALITY DISCLOSURE GROUP, THE LOW QUALITY DISCLOSURE GROUP, AND THE CONTROL GROUP

Kolmogorov-Smirnov Two-sample Test and Student's t-test

In order to examine the difference between:

(1) the high quality disclosure group and the control group,

(2) the high quality disclosure group and the low quality disclosure group, and

(3) the low quality disclosure group and the control group, the Kolmogorov-Smirnov two-sample test and the t-test were employed separately for each pair of the three categories mentioned above.

The detailed discussions on the Kolmogorov-Smirnov two-sample test and the student's t-test can be found on pages 39 and 41 respectively.

Analysis of Covariance (ANCOVA) Procedure

To evaluate the observed beta differences between the high quality and the low quality groups in a more formal way, the analysis of covariance (ANCOVA) procedure was applied. The variables identified for this test

were: (a) the disclosure score as a dependent variable, (b) the beta weight (risk measure) as an independent variable, and (c) quality (High and Low) as an independent variable. The beta weight is a continuous variable and, as such, it is a metric independent variable. Quality is a categorical (discrete) variable which is a non-metric factor. The designs in which metric independent variables are used in conjunction with non-metric factors are referred to as analysis of covariance (ANCOVA) design.

The two independent variables were the concern of the analysis; however, the effect of risk measure (Market beta) was of primary concern. Specifically, the ANCOVA investigated the percentage of explained variance of the individual independent variables (systematic risk and quality of disclosure) in the dependent variable (disclosure scores). Moreover, the interaction effect of both independent variables in the dependent variable was also determined. Finally, an F-test was employed for the statistical significance of the differences.

Summary

In this chapter the research methodology has been presented. The next chapter presents the results and the analyses of the parametric and non-parametric tests discussed.

CHAPTER 4

PRESENTATION AND ANALYSIS OF FINDINGS

This chapter presents the results of the tests discussed in Chapter Three. The results are presented in the order in which the respective tests were conducted.

COMPARISON OF THE EXPERIMENTAL AND THE CONTROL SAMPLES

The control and the experimental samples were compared for significant differences in their systematic risk. A non-parametric and parametric tests were employed (See Chapter 3).

Results of the Kolmogorov-Smirnov Two-Sample Test

A cumulative frequency distribution for the experimental and the control groups, based on ranges of the market betas were constructed (See Table 4.1). The absolute difference between the cumulative frequency in each cell was calculated. The largest absolute difference (D) was 23/150 or 0.153.

In testing for the significant difference between the control and the experimental samples, a two-tail test at $\alpha = .05$ was calculated. The critical value of D was calculated as follows:

TABLE 4.1

Cumulative Frequency Distributions
for Experimental and Control Groups

	0.55-0.86	0.87-0.97	0.98-1.18	1.19-1.39	1.40-1.60	1.61-1.80	TOTAL
Experimental Group	17	30	67	18	15	3	150
Control Group	40	18	44	25	19	4	150
Experimental Group	17/150	47/150	114/150	132/150	147/150	150/150	
Control Group	40/150	48/150	102/150	127/150	146/150	150/150	
Absolute Difference	23/150	11/150	12/150	5/150	1/150	0/150	

$$1.36 \sqrt{\frac{n_1 + n_2}{n_1 n_2}} \quad \text{.....(8)}$$

In order to reject the null hypothesis that the two-sample distributions are different, the absolute differences (d) must be equal or larger than the critical value of D is:

$$1.36 \sqrt{\frac{150 + 150}{150 \times 150}} = 1.36 \sqrt{\frac{300}{22500}} = 1.36 \sqrt{.013} =$$

$$1.36(.115) = .187$$

The largest absolute difference (d) from Table 4.1 is .153. Based on the above information, the null hypothesis cannot be rejected at the .05 significance level. The results indicated that both the experimental group and the control group may have the same beta distributions. The observed D indicated that the two samples have not been drawn from two populations in which one is stochastically larger than the other.

The Results of Student's t-test for the Experimental Group and the Control Group

The primary purpose of conducting Student's t-test was to provide an additional test of the differences

between systematic risk of the experimental and the control groups. The detailed discussion of the Student's test can be found in Chapter 3.

The results of the t-test are summarized in Table 4.2.

TABLE 4.2

The Control Group versus the Experimental Group

GROUP	N	MEAN	STD. DEV.	T-VALUE	LEVEL OF SIGNIFICANCE
Control	150	1.07	.27	-0.60	0.55
Experi-mental	150	1.08	.20	-0.60	0.55

Based on the results tabulated above, the mean of the control group is 1.07, while the mean of the experimental group is 1.08. The t-value of each group is -0.60, ($P > .55$). The null hypothesis of no difference cannot be rejected. This result indicated that there is no difference between the control group and the experimental group. However, a further analysis of the t-test statistics indicated that the variances of the two groups were statistically different at the 0.001 level of significance. This result showed that the dispersion of the systematic risk

of the two groups were statistically different. The results suggest that segmental disclosures are significant to the securities market; however, due to the skewness of the distributions of the betas of the control group, this conclusion is not strongly supported.

THE RESULTS OF THE ANNUAL REPORTS EVALUATION

One hundred and fifty 1978 annual financial reports were evaluated using the evaluation design discussed in Chapter 3. The highest score obtained was 96% and the lowest score was 32%. Seventy-five of the one hundred and fifty firms received scores between 96% and 70%, while the remaining seventy-five received scores between 69% and 32%. The median score was 70%. The median was used as a basis of classifying the experimental sample into two groups. Specifically, the following results were obtained from the evaluation (See Table 4.3).

Based on these results, the sample was divided into two groups. The firms with 70% and above were classified as the high quality disclosure group. The firms with 69% and below were classified as the low quality disclosure group. The detailed scores received by each firm can be found in Appendix A of this study.

TABLE 4.3

Distribution of disclosure scores
for the experimental sample

Score	Number of Firms
90-96%	1
80-89%	15
70-79%	59
60-69%	28
50-59%	28
40-49%	17
30-39%	2
	150

The Results of The Spearman Rank Correlation

As discussed in Chapter 3 the disclosure scores were compared statistically with SIC code scores based on four-digit, three-digit, and two-digit SIC codes. In conducting the Spearman Rank Correlation test, the following variables were used:

(1) Q1 = Four-digit code scores

(2) Q2 = Three-digit code scores

(3) Q3 = Two-digit code scores

(4) Q4 = Disclosure scores

(5) Q5 = Beta weight (Market beta)

(6) Q6 = Number of segments reported in the annual reports.

Detailed presentation of these variables can be found in Appendix A. The correlation between Q4 and Q1 is 45%, (i.e., r = .45) at the .0001 level of significance. The correlation between Q4 and Q2 is 39%, (i.e., r = .39) at the .0001 level of significance. The correlation between Q4 and Q3 is 29%, (i.e., r = .29) at the .0003 level of significance. The Spearman Rank Correlation results indicated that the segmental disclosure score has the highest correlated with four-digit code score. These results provide some evidence that disclosure scores obtained by the evaluation of the annual reports based on FASB Statement Number 14 can provide a measure of

difference in quality of disclosure. The Spearman Rank Correlation test was also conducted to test the correlation between Q1, Q2, Q3, Q4 and Q5 (Beta - the systematic risk). The purpose of this test was to determine which of the four disclosure scores had the highest correlation with the market beta. The following results were obtained:

(1) The correlation between Q1 and Q5 is -25%, ($P > .001$)

(2) The correlation between Q2 and Q5 is -22%, ($P > .001$)

(3) The correlation between Q3 and Q5 is -16%, ($P > .001$)

(4) The correlation between Q4 and Q5 is -54%, ($P > .0001$)

The segmental disclosure score has the highest correlation with beta. This supports the earlier test, and indicates that the segmental disclosure score relates to the systematic risk of the diversified firms.

Based on the above results, the disclosure scores appear to capture differences in quality of disclosure and are related to the systematic risk. Therefore, the segmental disclosure scores were used to divide the

sample observations into two groups. The high quality disclosure group and the low quality disclosure group represent the primary samples studied.

COMPARISON OF THE LOW QUALITY DISCLOSURE AND THE HIGH QUALITY DISCLOSURE GROUPS

The Results of Analysis of Variance Procedure

The Analysis of Variance test (ANOVA) was conducted to examine whether the disclosure score of the firms in either the high quality disclosure group or the low quality disclosure group were relatively the same. The results of the test of the high quality disclosure group are summarized in Table 4.4. The results of the low quality disclosure group are summarized in Table 4.5.

The results of the ANOVA test indicated that there is no difference within the high quality group. Therefore, the null hypothesis of no difference was not rejected. This result substantially supports the assumption that the high quality group is homogeneous on disclosure scores.

The results of the ANOVA test also indicated that there is no difference in disclosure scores within the low quality group. The null hypothesis of no difference was not rejected. This test also supports the assumption that the low quality group is relatively homogenous. The

TABLE 4.4

Analysis of Variance for the High Quality Group

Dependent Variable - Disclosure Group

SOURCE	DF	SS	MS	F-VALUE	LEVEL OF SIGNI-FICANCE	R^2
Model	16	416	26	0.87	0.60	0.19
Error	58	1731	29			
Corrected Total	74	2147				

Source	DF	SS	F-VALUE	LEVEL OF SIGNI-FICANCE
Beta	16	416	0.87	00.60

TABLE 4.5

Analysis of Variance for the Low Quality Group

Dependent Variable - Disclosure Score

SOURCE	DF	SS	MS	F-VALUE	LEVEL OF SIGNI-FICANCE	R^2
Model	16	1499	93	1.25	0.25	0.26
Error	58	4334	74			
Corrected Total	74	5834				

Source	DF	SS	F-VALUE	LEVEL OF SIGNI-FICANCE
Beta	16	1499	1.25	0.26

ANOVA results indicated that the low disclosure quality and the high quality groups are sufficiently homogeneous for further testing.

RESULTS OF THE DISCRIMINANT ANALYSIS TEST

The SPSS Computer Program "DISCRIMINANT ANALYSIS" was used to evaluate the extent that extraneous factors may have effected the systematic risk of the sample firms. SPSS performs discriminant analysis either by entering all discriminating variables directly into the analysis or through a stepwise method selecting the best set of discriminating variables. The criterion for controlling the stepwise selection in this study is the minimum "Mahalanobis" distance between groups. The "Mahalanobis" method seeks to maximize the smallest F ratio between pairs of groups.

The MDA method indentified four variables with discriminatory power: current assets/current liabilities (LQ), Dividend yield (DY), Earnings to Net Worth (EN), and Taxes to Net Profit (TX). The standardized Canonical Discriminant function coefficients were: LQ, 0.25738; DY, -0.67004; EN, -0.30095; and TX, -0.71485. These coefficients indicated that the high quality disclosure group had a lower current ratio, higher dividend yield, higher earnings to Net Worth and higher taxes to Net Worth than the low quality disclosure group.

The results of the MDA procedure are summarized in Tables 4.6 and 4.7 below:

TABLE 4.6

The Results of the Multiple Discriminant Analysis Test

STEP #	VARIABLE	F TO ENTER OR REMOVE	WLLK'S LAMBDA	LEVEL OF SIGNI-FICANCE
1	TX	10.410	.91	.0019
2	DY	8.854	.88	.0001
3	EN	1.6844	.87	.0002
4	LQ	1.2836	.86	.0003

TABLE 4.7

Classification Function Coefficients

Y =	1	2
LQ	5.518	5.862
DY	190.673	164.396
EN	74.771	70.179
TX	5.742	4.526
Constant	-18.766	-16.463

The canonical correlation of the canonical discriminant function was 0.37 which indicated 37 percent degree of separation between the two groups. Wilks' Lambdas for the four variables, TX, DY, EN, LQ, were .94, .88, .87, and .87, respectively. The larger the Wilks' Lambda, the less distinct the group. The Wilks' Lambdas were statistically significant at the .0001 significance level. The minimum Mahaloanobis' D^2 for the variables, TX, DY, EN, and LQ, were .27, .52, .57, and .51, respectively. The D^2 indicated the distance between the two groups on each variable. A Chi-square (X^2) value of 21.07 at four degrees of freedom was statistically significant at the 0.0001 significance level. The result of this test indicated that the null hypothesis of no differences between groups should be rejected. The differences were measured by the four discriminating variables.

The overall significance of the discrimination between groups was evaluated by using an F ratio to test whether the group centroids were equal or unequal. The group centroids for the high quality group and the low quality group were -0.38615 and 0.39658, respectively. Box's M test was conducted to evaluate the critical value of F. The result showed a statistically significant difference in the group centroids at the .0001 significance level. The F ratio is 3.01, with 10/105 degrees of

freedom. The null hypothesis of no differences was rejected. The classification results of the Multiple Discriminant Analysis is presented in Table 4.8 below:

TABLE 4.8

MDA CLASSIFICATION RESULTS

Actual Group	Number of Firms	Predicted Group	
		1	2
1 (high quality)	75	50 (66.7%)	25 (33.3%)
2 (low quality)	75	25 (33.3%)	50 (66.7%)

The major test of a discriminant model is the ability to classify companies compared to an alternative classification method. If the error rates arising from the use of the model are low, the financial ratios in the MDA model may provide a basis to classify companies for research purposes. The error rates in the classification results presented in Table 4.8 were the same for both groups. The high quality group (Group 1) had a 33.3% error rate

as did the low quality group (Group 2). The overall percent of the cases correctly classified was 66.7 percent. The maximum chance criterion that the discriminant function is a good classifier is 50 percent. The percent correctly classified in group one is 66.7 percent. The percent correctly classified in group two is also 66.7 percent. The four variables that separated the two groups were investigated further. Taxes to Net Income variable which was the most powerful discriminating variable was examined by looking at the extent of industry diversification between and within the two groups. The questions addressed were:

1. Were the high quality and the low quality groups well diversified?

2. Were firms from the same industry in both groups or did certain industries concentrate in one group?

An examination of these two questions indicated that both groups were well diversified and that no certain industries were concentrated in either group. Therefore, there were no differences between the two groups along either of the two possibilities mentioned above.

An analysis of the Taxes to Net Income variable indicated that the high quality group had a higher ratio of taxes to net income variable than the lower quality

disclosure group. This result did not by itself indicate that taxes to net income variable is a good determinant of the systematic risk of the firms because one would expect high quality firms with low systematic risk to have low taxes to net income. Therefore, the taxes to net income variable did not pose any problem to the homogeneity of the two groups.

Statistical Analysis System (SAS) Computer Program "DISCRIMINANT ANALYSIS" with a hold-out sample was also employed for this test. Out of the one hundred and fifty companies, one hundred companies were used (i.e., fifty companies from each group), to construct the MDA models. The remaining fifty companies (twenty-five companies in each group) were held out for the statistical test. The purpose of using a hold-out sample was to avoid the upward bias problem in the model. The results of the SAS analysis were consistent with the SPSS results reported above.

The results of the MDA analysis indicated that the two groups were statistically different on the four variables identified above. These variables would not allow the corect classification of the firms at a rate much better than chance. Therefore, for the firms studied, extraneous variables which have been shown to related to beta appeared not to be influential in this study.

In order to further examine the relationship between the financial variables and the systematic risk, a Multiple Regression Analysis was conducted. The results are presented in Table 4.9.

TABLE 4.9

The Results of the Stepwise Multiple Regression Analysis

Variable Name	Significance Level
Divident yield	0.0001*
Leverage	0.0096*
Earnings Margin	0.1197**
Taxes to Net Income	0.2482**
Cashflow per share	0.1988**
Liquidity	0.2093**
Size	0.1698**

*Significant at .001
**Not Significant at .10

Note that the following variables do not meet the 0.5000 significance level for entry into the regression model: Price/Earnings, Dividend payout, Earnings to Net Worth, Earnings to Net Capital Expenditures, and Growth in Earnings.

The variables found to be significantly related to market risk were dividend yield and leverage. Leverage was not significantly different among all firms (the experimental sample). Dividend yield was a significant variable in the discriminant function. Therefore, the financial variables previously shown to be related to market risk have been controlled with the exception of dividend yield. The dividend yield by itself should not bias the investigation.

A non-parametric Spearman Rank correlation test was also conducted to determine if the financial variables affected the systematic risk. The results were identical to the multiple regression analysis discussed above. Furthermore, the correlation of systematic risk with disclosure quality was more significant than any of the twelve financial variables (See Table 4.10).

The Spearman Rank Correlation study validates the Multiple Regression tests reported earlier. Based on these results, liquidity did not have statistical significant correlation with systematic risk of a firm. Also, taxes to net earnings did not have any significant statistical relationship with systematic risk. The dividend yield by itself should not bias the relationship between the systematic risk and the quality of disclosure.

TABLE 4.10

Spearman Rank Correlation Results

Relationship Between Beta (Systematic Risk)
Twelve Financial Variables and Disclosure Quality

Variables	Correlation Coefficient	Level of Significance
1. Disclosure Quality (high cr low)	.47	0.001
2. Liquidity	.06	0.43
3. Size	-.13	0.10
4. Cashflow per share	-.11	0.18
5. Price Earnings	0.00	0.95
6. Dividend payout	-0.33	0.0001
7. Dividend yield	-0.04	0.0001
8. Earnings to Net Worth	0.12	0.16
9. Earnings to Capital Expenditures	0.05	0.54
10. Leverage	0.11	0.18
11. Earnings to Margin	-0.06	0.45
12. Taxes to Net Income	-0.09	0.27
13. Growth in Earnings	0.04	0.67

COMPARISON OF SYSTEMATIC RISK AND QUALITY OF DISCLOSURE

The main objective of the study was to examine empirically the impact of quality of segmental disclosures on the securities market. The main investigation was concerned with the experimental group which was divided into two groups based on the disclosure scores discussed in Chapter 3. The first test in comparing the systematic risk of the high quality and the low quality groups was to examine whether the two-group cumulative distributions were drawn from the same population. The Kolmogorov-Smirnov two-sample test was employed for this test. The result of the cumulative frequency distributions is presented in Table 4.11.

The largest absolute difference (D) is 35/75 or .4667 (See Table 4.11). In testing for the significant difference in systematic risk between the high quality and low quality disclosure groups at the .01 significance level, equation (8) was used to calculate the critical value of D as follows:

$$1.63 \sqrt{\frac{75 + 75}{75 \times 75}} = 1.63 \sqrt{0.027} = 1.63\ (0.163) = 0.2657$$

Based on the above information, the null hypothesis of no difference was rejected for the high quality and the low quality disclosure groups at the .0001 significance level.

TABLE 4.11

Cumulative Frequency Distributions for the High Quality Disclosure Group and the Low Quality Disclosure Group

GROUPS	BETAS						TOTAL
	0.55-0.86	0.87-0.97	0.98-1.18	1.19-1.39	1.40 1.60	1.61 1.80	
High Quality Group	15	26	27	4	2	1	75
Low Quality Group	2	4	40	14	13	2	75
High Quality Group	15/75	41/75	68/75	72/75	74/75	75/75	
Low Quality Group	2/75	6/75	46/75	60/75	73/75	75/75	
Absolute Difference	13/75	35/75	22/75	12/75	1/75	0	

The observed D indicated that the two samples were drawn from two different populations in which one was stochastically larger than the other.

Thus far, the statistical tests showed the experimental and the control groups' cumulative beta distributions appeared not to be significantly different, but the high quality disclosure and the low quality disclosure groups' cumulative beta distributions appeared to be significantly different. However, the cumulative beta distributions of the high quality disclosure group and the low quality disclosure group have not been compared with the control group. The Kolmogorov-Smirnov two-sample test was used for the comparison. The cumulative frequency distribution is presented in Table 4.12 for the Control group and the High Quality group.

The largest absolute difference (D) is 34/150 or .2267. In testing for the significant difference between the control sample and the high quality group, equation (8) was used to calculate the critical value of D. The critical value of D was calculated as follows:

$$1.36\sqrt{\frac{150 + 75}{150 \times 75}} = 1.36\sqrt{0.02} = 1.36(0.1414) = 0.1923$$

Based on the above information, the null hypothesis of no difference was rejected for the control group and the high quality disclosure group at the .05 significance level.

TABLE 4.12

Cumulative Frequency Distributions for The Control Group and The High Quality Disclosure Group

GROUPS	BETAS						
	0.55-0.86	0.87-0.97	0.98-1.18	1.19-1.39	1.14-1.60	1.61 1.80	TOTAL
Control Group	40	18	44	25	19	4	150
High Quality Group	15	26	27	4	13	2	75
Control Group	40/150	58/150	102/150	127/150	146/150	150/150	
High Quality Group	15/75	41/75	68/75	72/75	74/75	75/75	
Absolute Difference	10/150	25/150	34/150	17/150	2/150	0	

The observed D indicates that the two samples have been drawn from two different populations in which one is stochastically larger than the other.

Finally, the Kolmogorov-Smirnov two-sample test was conducted to find the difference in the cumulative beta distributions between the control group and the low quality disclosure group. The cumulative frequency distribution of the two groups is presented in Table 4.13.

The largest absolute difference (D) is 46/150 or .3067. Equation (8) was used to calculate the critical value of (D). The critical value of D was calculated as follows:

$$1.63\sqrt{\frac{150 + 75}{150 \times 75}} = 1.63(.1414) = 0.2305$$

Based on the above information, the null hypothesis of no difference was rejected for the control group and the low quality disclosure group at the .01 significance level. The observed D indicated that the two groups have been drawn from two different populations in which one is stochastically larger than the other.

A Student's t-test was used to cross validate the non-parametric test results presented above. The results of the t-test statistics for the control group versus the high quality disclosure group, the control group versus the low quality disclosure group, the high quality disclosure group verus the low quality disclosure group are summarized in Tables 4.14, 4.15, and 4.16, respectively.

TABLE 4.13

Cumulative Frequency Distributions for The Control Group and The Low Quality Disclosure Group

GROUPS	BETA						
	0.55-0.86	0.87-0.97	0.98-1.18	1.19-1.39	1.40 1.60	1.61-1.80	TOTAL
Control Group	40	18	44	25	19	4	150
Low Quality Group	2	4	40	14	13	2	75
Control Group	40/150	58/150	102/150	127/150	146/150	150/150	
Low Quality Group	2/75	6/75	46/75	60/75	73/74	75/75	
Absolute Difference	36/150	46/150	10/150	7/150	0/150	0	

TABLE 4.14

Control Group Versus High Quality Disclosure Group

GROUP	N	MEAN BETA	STD. DEV.	T-VALUE	PROB T
Control	150	1.07	.27	2.42	0.01
Experimental	75	1.00	.17	2.09	0.03

TABLE 4.15

Control Group Versus Low Quality Disclosure Group

GROUP	N	MEAN BETA	STD. DEV.	T-VALUE	PROB T
Control	150	1.07	.27	3.29	.0001
Low Quality	75	1.17	.19	2.98	.0001

The mean beta of the control group was 1.07, while that of the high quality disclosure group was 1.00. The t-value of 2.42 indicated a significant difference in the mean betas of the two groups. Also, the variances of the two groups were different. Therefore, the null hypothesis of no difference was rejected indicating that the high quality

disclosure firms have lower systematic risk than the control sample firms.

TABLE 4.16

High Quality Disclosure Group Versus
Low Quality Disclosure Group

GROUP	N	MEAN BETA	STD. DEV.	T-VALUE	LEVEL OF SIGNIFICANCE
High	75	1.00	.17	5.84	0.0001
Low	75	1.17	.19	5.84	0.0001

The next student's t-test was conducted to compare the mean betas of the control group with those of the low quality group. The results of this test are summarized in Table 4.15.

The mean beta of the control group was 1.07, and that of the low quality disclosure group was 1.17. The t-value of 3.29 indicated a statistically significant difference in the mean betas of the two groups at the 0.001 significance level. The variances of the two groups were also statistically different at the 0.001 significance level. Therefore, the null hypothesis of no difference was rejected. These

results indicated the control group has a lower systematic risk than the low quality disclosure group.

The final student's t-test was conducted to compare the high quality disclosure group with the low quality disclosure group. The results of this test are summarized in Table 4.16.

The mean beta of the high quality disclosure group was 1.00; while the mean beta of the low quality disclosure group was 1.17. The t-value of 5.84 indicated statistically significant difference at the 0.001 significance level. Therefore, the null hypothesis of no difference was rejected. The results indicated generally the high quality group has a lower systematic risk than the low quality group.

RESULTS OF THE ANALYSIS OF COVARIANCE - HIGH QUALITY DISCLOSURE GROUP VERSUS LOW QUALITY DISCLOSURE GROUP

The results of the ANCOVA Tests strongly suggest that the high quality group is significantly different from the low quality group at the 0.001 significance level. Specifically, the quality of disclosure variable is significantly different between the high quality disclosure firms and the low quality disclosure firms, at the 0.05 significance level. The beta variable is significantly different at the 0.001 significance level. The interaction

effect of the quality and beta is not significant at the 0.51 significance level. The test statistic for the ANCOVA test is presented in Table 4.17.

SUMMARY OF FINDINGS

Line-of Business Reporting Firms Versus Non-Line-Of-Business Reporting Firms

One of the important issues this investigation has addressed concerned the capital market reaction to mandated FASB's Line of Business disclosures. Mautz and May suggested that diversified firms that produce segmental disclosure information suffer competitive disadvantage as opposed to the diversified firms or single-product firms that are not required to provide line-of-business information in their annual reports.[1]

Thus study applied the Kolmogorov-Smirnov two-sample test and the student's t-statistics to examine whether there were differences in the beta distributions and the mean betas of the two samples. The results of the tests indicated the two samples are not statistically different. This finding suggests the line-of-business reporting firms

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[1] Mautz, R. K., and May, W. G., "Financial Disclosure in a Competitive Economy," Financial Executive Research Foundation, New York, 1978.

TABLE 4.17

Results of the Analysis of Covariance

SOURCE	DF	SS	MS	F-VALUE	LEVEL OF SIGNIFI-CANCE	R^2
Model	3	15202	5069	97.50	0.0001	0.67
Error	146	7583	52			
Corrected Total	149	227790				

SOURCE	DF	SS	F-VALUE	LEVEL OF SIGNIFI-CANCE
Quality	1	187	3.61	0.05
Beta	1	491	9.47	0.0001
Quality Beta	1	22	0.43	0.51

may not be significantly different from the non-line-of-business reporting firms.[2]

A further analysis of the two samples indicated the variances of the two groups were statistically different at the 0.001 level of significance. Therefore, the equality of the group means did not tell the whole story about the samples. The difference in the variances between the two groups relates to the spread or variability of the data. The variance measures the extent to which the values of a set of observations are dispersed. Since the variances were different, the two groups were not homogeneous. There was a greater dispersion in the control sampe (non-line-of-business reporting firms). The smallest beta in the control sample was 0.55 and the largest beta was 1.80, while the mean was 1.07. In the experimental sample (line-of-business reporting firms), the smallest beta was 0.70 and the largest beta was 1.80, while the mean was 1.08. The line-of-business reporting firms demonstrated lower variance in systematic risk than the non-line-of-business reporting firms. The

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[2] Kang, J. S., "A Study of Intersegment Allocation Problems in Segmental Financial Disclosure," Unpublished Ph.D. dissertation, Texas A & M University, 1977.

results confirm the findings of Kinney[3], Collins[4] and more importantly, Simonds and Collins[5].

In the Foster[6] study entitled "Externalities and Financial Reporting", he quoted the Wall Street Journal, 29 December, 1978, p. 11 as follows:

> "The company maintains that publishing information required of public companies by the SEC would put it at a severe competitive disadvantage, since the data would be available to its main competitor, the Dallas Times Herald, which is owned by Times Mirror Company, Los Angeles. Belo maintains that because it is significantly smaller than Times Mirror, financial disclosures required by the SEC would reveal too much of its inner workings. Times Mirror owns several major papers and can group its newspaper financial data for reporting purposes. By contrast, the Dallas Morning News is the only major newspaper property of Belo." (p. 524).

The above quotation is contrary to the efficient market hypothesis[7] which states that all publicly available information is impounded in the security prices.

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[3]Kinney, op. cit.

[4]Collins, op. cit.

[5]Simonds and Collins, op. cit.

[6]Foster, George, "Externalities and Financial Reporting," The Journal of Finance, (May, 1980), pp. 521-532.

[7]For further study on the Market Efficiency, See Fama, E. F., "The Behavior of Stock Market Prices," Journal of Business, (January, 1965).

The results obtained in this study also refutes the assumption that the line-of-business reporting firms are at a competitive disadvantage to their counterparts which are not required to disclose segmental data.

High Quality Disclosure Firms Versus Non-Line-Of-Business Reporting Firms

A further analysis was conducted to examine whether the control group (non-line-of-business reporting firm) had lower systematic risk than either the diversified firms that report high quality disclosures or the low quality disclosures.[8] These propositions were tested by using the Kolmogorov-Smirnov two-sample test and the student's t-test, respectively. The first proposition was that there was no difference between the high quality disclosure firms and the control sample. The results provided a basis to reject the null hypothesis at the 0.05 level of significance. Therefore, the two groups have been drawn from two different populations in which one is stochastically larger than the other.

A student's t-statistics was also conducted to find the difference between the mean betas of the two groups. The results showed that the mean betas of the two groups

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[8] See Chapter 3 for further discussion on the Characteristics of High Quality Disclosure Firms and Low Quality Disclosure Firms.

were significantly different at the .016 level of significance. The results indicated the high quality disclosure group generally has lower risk than the control group.

A further analysis on the difference in systematic risk between the two groups was conducted by investigating the difference in the variances of the two groups. Again, the null hypothesis that the variances are not statistically different was rejected at the 0.0001 level of significance. The minimum beta for the control group was 0.55 and the maximum was 1.80, while the minimum beta for the high quality disclosure group was 0.70 and the maximum was 1.65. The standard deviations of the betas for the control group and the high quality group were 0.27 and 0.17, respectively. The results of this analysis indicated again the control group had a higher systematic risk than the high quality disclosure group. Investors appear to be less certain about the segmental data not disclosed by the non-line-of-business reporting firms.

Low Quality Disclosure Firms Versus Non-Line-Of-Business Reporting Firms

Kolmogorov-Smirnov two-sample test and the student's t-test were used to test the difference between the diversified firms that disclose poor segmental data and the non-line-of-business reporting firms. The results of the Kolmogorov-Smirnov test indicated the two samples

were statistically different. Therefore, the null hypothesis of no difference was rejected at the 0.01 level of significance. The results also indicated the two groups come from two different populations.

A student's t-test was conducted to find whether there are differences between the two groups. Again, the null hypothesis of no difference was rejected at the 0.001 level of significance. A further analysis on the variances between the two groups provided the following results. The minimum beta for the control group was 0.55 and the maximum was 1.80. The minimum observation for the low quality group was 0.80, while the maximum observation was 1.80. The mean betas of the control group and the low quality group were 1.07 and 1.17 respectively. The standard deviations of the control group and the low quality group were 0.27 and 0.09 respectively. Based on the above results, the null hypothesis of no difference in the variances was rejected at the 0.004 significance level. The results indicated the control group (non-line-of-business reporting firms) had a lower systematic risk than the low quality group (firms that report poor quality disclosures). The results further indicated the investors may be less certain about the segmental data reported by the low quality group. This situation may arise because the segmental information may not be

detailed or explicit. Also, the investors may think that the low quality disclosure group may be hiding some information to be presented in the segmental data. These two situations are possibilities.

High Quality Disclosure Firms Versus Low Quality Disclosure Firms

The major part of this investigation is to examine whether the investors react to the quality of segmental disclosures. The results of the Kolmogorov-Smirnov test indicated the beta distributions of the two groups were different at the 0.01 level of significance.

The student's t-test was conducted to examine differences in systematic risk between the two groups. The minimum beta for the high quality group was 0.70, and the maximum was 1.65. The minimum beta for the low quality group was 0.80, and the maximum was 1.80. The means of the high quality and the low quality groups were 1.00 and 1.17, respectively. The standard deviations of the high quality and the low quality groups were 1.97 and 2.30, respectively. The results indicated the mean betas of the two groups are significantly different at the .001 level of significance. The results also indicated the high quality disclosure group to have lower systematic risk than the low quality disclosure group.

The above results are consistent with the findings of the Kochanek[9] study which reported that:

> "Results of the Mann-Whitney U test at the 0.05 level of significance confirmed the a priori expectation that "good" reporters would exhibit higher positive Spearman Rank Correlation Coefficients in the intermediate and the long-term models than "poor" reporters. The null hypothesis of no difference is, r_s coefficients, between "good" and "poor" reporters was rejected at the 0.04 level of significance for the intermediate model, and at the 0.03 significance level for the long-term model." (p. 256)

He concluded that his evidence suggests that segmental reporting aided investors in anticipating future earnings changes in the present valuation of securities.

The present study also confirms Singhvi and Desai[10] study which concluded that:

> Adequate disclosure of information minimized ignorance in the market and causes the market price to reflect the true value of the security; consenquently, the price dispersion is narrowed down. The dispersion between the market price and the intrinsic value of a security in part is the result of the quality of information - the more superior the quality of information disclosed, the lower will be the price dispersion. (p. 136).

The authors reiterated that one of the reasons why the investors buy securities at a price which is higher than the

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[9]Kochanke, op. cit.

[10]Singhvi and Desai, op. cit.

intrinsic value, or sell at the price which is lower than the intrinsic value is the lack of information which is necessary to determine the intrinsic value of the security. Most of these studies have implicitly assumed that "information content" or "usefulness" can be discerned by observing reactions to specific information items.

Analysis of Covariance: High Quality Group Versus Low Quality Group

A further examination on the differences between the high quality disclosure group and the low quality disclosure group was conducted by using Analysis of Covariance (ANCOVA). The results suggested that the high quality group generally has a lower systematic risk than the low quality group. The model for this test is significant at the 0.0001 level of significance. The F-value was 97.50, while the R-square (R^2) was 0.67. The difference between the high quality and the low quality groups was significant at the 0.05 level of significance, and the F-value was 3.61. The difference in the systematic risk between the high quality and the low quality group was significant at the 0.0001 level of significance and the F-value in this model was 9.47.

The ANCOVA analysis also provided a basis to test if the two independent variables, quality of disclosures (a non-metric variable) and beta (a metric variable) were

interactive. The results indicated there was no interaction between the two independent variables. The null hypothesis of no interaction was not rejected at the 0.51 level of significance. The F-value was 0.43. These results indicated the reaction of the securities market to the quality of segmental disclosure may be independent of other variables.

The final chapter presents a summary, the conclusions, the implications, the limitations of the study and the recommendations for further research.

CHAPTER 5

SUMMARY, CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

Summary

The primary objective of the study was to investigate the securities market reaction to the quality of segmental reporting disclosures required by FASB Statement Number 14 in assessing the systematic risk of diversified companies. The secondary objective was to update the previous studies which examined the securities market reaction to the SEC segmental disclosure rules.

The investigation was based on the assumption of the efficient market hypothesis in the semi-strong form that the stock prices adjust rapidly and in an unbiased manner to publicly available information. The efficient market research has also indicated that published financial statements provide data to the market that are recent and unobtainable from other sources. Based on the efficient market hypothesis and its related methodology, a basis for evaluating the market effects of segmental disclosures was provided.

To examine the securities market reaction to the segmental disclosures, three hundred diversified firms were selected from the Value Line tape and the Value Line

Investment Survey Records of 1978. The firms were divided into two groups:

(1) firms that reported segmental data as required by FASB Statement Number 14, and

(2) diversified firms that did not disclose segmental data.

The Kolmogorov-Smirnov two-sample test and the student's t-test were employed to determine any differences in the systematic risk between the two samples. The results of the non-parametric test showed that the beta cumulative distributions of the two samples were not significantly different. A student's t-test results indicated no statistically significant difference in the mean betas of the two samples. However, the variances between the two samples were significantly different at the 0.0001 level of signficance.

The next step presents the evaluation of the annual financial reports of the one hundred and fifty diversified firms (the experimental group) that reported segmental information in the annual financial reports. The purpose of this evaluation was to classify the sample into two groups - high quality disclosure and low quality disclosure firms. SIC industry code scores were calculated for each of the one hundred and fifty firms. A disclosure score was calcualted by dividing the points earned

by an individual firm by the maximum points available from the evaluation design. For example, if a firm obtains a score of 72 out of the maximum score of 90, the firm obtains an 80% (72/90) score. The maximum score a firm could obtain is one hundred percent. A Spearman Rank Correlation test was used to validate the disclosure scores obtained from the evaluation design of the annual financial reports. The results indicated statistically significant correlation between the SIC industry code scores[1] and the disclosure scores at the 0.0001 level of significance. The correlations also provide some evidence that the disclosure scores did measure differences in quality of disclosure of segment data.

The sample was divided into two groups based on the disclosure scores. Seventy percent was the median score for the one hundred and fifty firms. The firms that received scores between 70% and 96% were classified as the high quality disclosure group. The firms that received scores between 69% and 32% were classified as the low quality disclosure group. One-way ANOVA was conducted to examine the differences within each group based on the disclosure scores. The results of the ANOVA test

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[1]Four-digit, three-digit and two-digit SIC code scores were computed respectively. Each of these SIC digit codes was correlated with disclosure scores. Four-digit code scores had the highest correlation (See Chapter 4).

indicated differences within groups were not statistically significant.

Multiple discriminant analysis was used to examine any differences between the two groups. Twelve financial variables were examined. They were the independent variables. The dependent variables were the two groups. The results of the Multiple Discriminant Analysis indicated the two groups were not statistically different except in the following variables: Current Assets/Current Liabilities (LQ), Dividend Yield (DY), Earnings to Net Worth (EN), and Taxes to Net Profit (TX).

To determine which financial variables were significantly related to the beta, a stepwise Multiple Regression Analysis was conducted, in which beta was the dependent variable and the twelve financial variables were the independent variables. Only dividend yield was statistically significant at the 0.0001 level of signficance. A Spearman Rank Correlation test was also conducted to find the relationship between the financial variables used in the Multiple Discriminant Analysis and the betas of the two groups. The results indicated Current Assets/Current Liabilities (LQ), Earnings to Net Worth (EN), and Taxes to Net Profit (TX) were not significantly associated with systematicic risk (beta); however, dividend yield was

significantly correlated with systematic risk, but this variable by itself was not a strong discriminating variable.

The major investigation of this study was to examine the differences in systematic risk between:

(1) the control group (diversified firms that reported consolidated annual financial reports only) and the experimental group (diverisified firms that reported segmental data),

(2) the control group and the high quality disclosure group,

(3) the control group and the low quality disclosure group, and

(4) the high quality disclosure group and the low quality disclosure group.

The mean betas of the control group and the experimental group were not significantly different but the variances between the two groups were significantly different. Because of possible contaminating factors, beyond the control of the researcher, attributing this difference only to non-segmental disclosures is subject to question. The Kolmogorov-Smirnov two-sample tests and the t-tests were employed to find the differences between each pair of the groups listed above. The results of the comparison of the control group and the high quality disclosure

group indicated there was a significant difference in the beta cumulative distributions, and that the variances (dispersion) of the beta distributions were significantly different for these two groups.

A comparison of the systematic risk of the control group and the low quality disclosure group indicated that the mean betas of the two groups were statistically different, and that the two groups' variances were statistically different.

Three tests were conducted to compare the high quality disclosure group and the low quality disclosure group. The Kolmogorov-Smirnov test results indicated that the beta cumulative distributions of the two groups were statistically different. The t-test results indicated that the two group means were also statistically different. The Analysis of Covariance results indicated that the variances of groups were statistically different. The high quality and low quality disclosure groups were also statiscally different on the quality of disclosure. the test of interaction between systematic risk (a metric variable) and quality (a non-metric variable) indicated that the two variables were not interactive. That is, the interaction effect between beta and quality was not significant.

Conclusions and Implications

This study indicates that the quality of disclosure may be a factor considered in assessing the systematic risk of diversified firms. Inadequate financial disclosure in the annual financial reports is likely to widen fluctuations in the security prices since investors are likely to base their investment decisions, in the absence of adequate disclosure, on less objective measures. Consequently, the cost of capital to firms may be higher, leading to inefficient allocation of capital resources in the economy.

Three conclusions are drawn from this investigation:

1. The findings with regard to the control group and the experimental group, indicate that these two samples may have the same group means, but the variances (dispersions) are different. As Beaver[2] has noted, the results of this study indicate that investors are less certain about the financial information that is not disclosed.

2. The findings with regard to the comparison of the high quality disclosure and the low quality disclosure groups indicate that the high quality disclosure firms generally may have lower systematic risk than the low quality disclosure firms. These findings support the assertion of the Financial Accounting Standards Board

[2]Beaver, op. cit.

and the Securities and Exchange Commission that adequate and informative disclosures in the annual financial reports and the 10K reports will enable investors to assess the systematic risk of firms more accurately.

3. The findings with regard to the high quality disclosure group, the low quality disclosure group and the control group, demonstrate that the high quality disclosure group has lower systematic risk than either the control group or the low quality disclosure group. The low quality disclosure group may be penalized with higher systematic risk for not disclosing adequate information since the firms in this group are required to provide segmental data. The test results indicated that the control group has lower systematic risk than the low quality disclosure group, but higher systematic risk than the high quality disclosure group. The evidence indicates that the quality of disclosure appears to be a variable related to systematic risk. Nevertheless, where segment disclosures are required, the results indicate that investors prefer more information to less, and that such information appears to be informative.

Limitations of the Study

This study was quasi-experimental research. The sample used was not randomly selected. The effect of

randomization is to minimize systematic error in the results of the research being investigated. The sample of firms may be situation-specific in the sense that the firms used are firms with the total assets of $500 million and above. The generalization of the results to smaller firms may create some problem. There may be other variables which interact with the quality of disclosures that the statistical methods used in this study were unable to detect or eliminate. No such variables are known as far as this research is concerned.

Recommendations for Further Research

The importance of segmental disclosures cannot be over-emphasized in this age of industrial diversification. Companies attempt to diversify risks of investing in one product line by investing in multi-product lines. As such, empirical investigations are needed on segmental reporting by the diversified companies. In the past, this aspect of reporting was not taken seriously because many companies were engaged in one or few product lines, but decentralization has created investment centers and business segments. A study is needed to investigate how communication of the results of operations of these segments could be improved to aid the financial statement users.

While this research has employed Multiple Discriminant Analysis, Kolmogorov-Smirnov two-sample test, t-test and the ANCOVA technique, future research studies could investigate this problem by using other statistical tools and other variables which may be useful in communicating the segmental information to the financial statement users. While this study used annual financial statement information and systematic risk, other studies could use residual analysis. The effect of disclosures could be examined by observing the residual returns before and after the FASB's disclosure rule became effective. Finally, while this investigation found that those firms that have high quality segmental disclosures have lower systematic risk than either the control group or the low quality disclosure group, further investigation is warranted to validate these findings and other previous findings which reported similar results.

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APPENDICES

APPENDIX A

DIVERSIFIED FIRMS THAT REPORT SEGMENTAL DISCLOSURES IN THE ANNUAL REPORTS

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Betas	Number of Segments in Annual Report
ACF Industries	2	250	2	250	2	250	070	095	5
ARA Services	5	120	5	120	3	200	096	115	6
Alries Stores	4	130	3	166	2	250	041	115	5
Abbott Lab.	6	067	4	100	2	200	070	115	4
Krogger Co.	5	100	5	100	5	100	070	095	5
Black & Decker	4	100	4	100	4	100	050	130	4
Albertson's Inc.	4	125	4	125	3	167	076	085	5
Peabody Intl.	5	120	3	200	3	200	070	160	6
Allied Chemical	6	083	4	125	2	250	056	110	3
American Stores	5	100	3	167	3	167	078	085	5
Allis-Chambers	6	050	4	075	1	300	046	130	3
Amerada Hess	4	100	4	100	4	100	070	110	5
American Airlines	5	080	5	080	5	080	040	140	4

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Betas	Number of Segments in Annual Report
American Brands	6	067	6	066	3	133	080	085	4
American Can	6	050	5	060	4	075	070	070	3
American Cyanimid	6	067	5	080	2	200	048	110	4
American Motors	3	100	1	300	1	300	070	095	3
American Standard	6	067	6	067	6	067	060	110	4
American Telephone	3	100	3	100	2	150	070	075	3
Amsted Industries	6	083	5	100	3	167	074	085	5
Amstrong Cork	6	067	5	080	5	080	058	100	4
Ashland Oil	5	100	5	100	4	125	072	090	5
Atlantic Richfield	3	167	3	167	3	167	078	090	5
Avon Products	2	150	2	150	2	150	058	140	3

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Betas	Number of Segments in Annual Report
Aetna Life & Cas.	5	060	5	050	3	100	044	125	3
Belco Petro. Corp.	5	060	5	060	5	060	060	105	3
Bendix Corp.	4	075	4	075	4	075	060	110	3
Bethlehem Steel	3	100	3	100	3	100	034	150	3
Boeing Company	3	133	2	200	3	300	071	110	4
Boise Cascade Corp.	5	100	5	100	2	250	073	140	5
Burroughs Corp.	5	060	4	075	3	100	045	105	3
Celanese Corp.	6	083	6	083	2	250	072	100	5
Champion Intl. Corp.	5	060	5	060	2	150	050	110	3
Chesebrough-Ponds	6	067	5	080	5	080	046	110	4
Chessie System Inc.	4	075	4	075	4	075	042	085	3
Chicago Bridge & Iron	5	080	4	100	4	100	053	095	4

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
Chrysler Corp.	6	033	5	040	3	067	054	150	2
Chubb Corp.	5	100	5	100	2	250	070	105	5
Cities Service Co.	6	083	6	083	4	125	070	085	5
Continental Corp.	5	160	5	160	4	200	076	090	8
Continental Group Inc.	6	150	5	080	3	133	086	080	4
Continental Oil	6	067	6	067	6	067	066	105	4
Control Data Corp.	6	067	5	080	5	080	045	165	4
Crane Co.	6	100	5	120	5	120	070	095	6
Crown Cork & Seal Company, Inc.	3	067	3	067	2	100	064	100	2
Crum & Forster	5	060	5	060	2	150	045	110	3
Deere & Co.	3	067	2	100	1	200	058	110	2
Delta Airlines Inc.	1	200	1	200	1	200	054	130	2

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
Diamond Intl. Corp.	6	100	6	100	5	120	062	090	6
Diamond Shamrock Corp.	6	100	5	120	3	200	068	115	6
Digital Equipment Corp.	4	075	4	075	3	100	046	130	3
Dow Chemical Co.	6	050	4	075	1	300	058	150	3
DuPont	4	100	3	133	3	133	062	100	4
Eastern Airlines Inc.	4	075	4	075	3	100	048	130	3
Eastman Kodak Co.	6	050	4	075	2	150	062	115	3
Eckerd (Jack) Corp.	3	067	3	067	3	067	046	140	2
Ethyl Corp.	5	060	5	060	3	100	070	105	3
Evans Prod. Corp.	5	080	5	080	5	080	050	150	4
Exxon Corp.	6	100	6	100	5	120	086	095	6
Firestone Tire & Rubber	6	100	5	120	5	120	078	105	6

	4 Digit	Ratio	3 Digit	Ratio	2 Digit	Ratio	Disclosure Score	Beta	Number of Segments in Annual Reports
Flintkote Co.	6	083	2	250	2	250	050	110	5
Ford Motor Co.	5	040	4	050	3	067	068	105	2
Fruehauf Corp.	5	040	3	067	1	200	066	100	2
GAF Corp.	6	050	6	050	6	050	065	110	3
Gatx Corp.	6	083	6	083	6	083	050	095	5
General Dynamics Corp.	6	067	5	080	3	133	058	140	4
General Motors Corp.	4	100	3	133	2	200	088	105	4
General Telephone	3	167	3	167	2	250	072	090	5
General Tire & Rubber	6	067	6	067	4	100	024	100	4
Georgia-Pacific Corp.	3	133	3	133	2	150	055	105	4
Getty Oil Co.	6	100	6	100	6	100	076	085	6
Goodrich (B.F.)	5	060	5	060	3	100	068	110	3

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Reports
Goodyear Tire & Rubber	4	100	4	100	3	133	072	110	4
Gould Inc.	5	080	5	080	4	100	-	-	4
Grace (W.R.)	5	100	5	100	3	166	071	105	5
Great A & P	6	067	5	080	2	200	48	80	4
Great North Nekoosa	4	050	4	050	3	067	56	105	2
Gulf Oil	5	080	5	080	5	080	60	90	4
Hammermill Paper	5	080	4	100	2	200	56	110	4
Hewlett-Packard Co.	6	067	5	080	3	133	54	120	4
Honeywell Inc.	6	050	5	060	4	075	67	130	3
IC Ind. Inc.	6	100	6	100	6	100	80	100	6
Inland Steel	5	120	3	200	2	300	81	80	6
Intl. Business Machines	6	067	4	100	4	100	50	100	4
Intl. Harvester	5	100	5	100	2	250	66	100	5
Intl. Paper Co.	6	100	6	100	2	100	54	115	6

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Scores	Beta	Number of Segments in Annual Report
Johns-Manville Corp.	6	067	5	080	4	100	50	110	4
Kaiser Steel Corp.	6	033	6	033	4	050	62	120	2
Kimberly-Clark Corp.	5	060	4	075	2	150	68	110	3
Lear Siegler Inc.	6	083	6	083	4	125	68	120	5
Lilly, Eli & Co.	6	050	4	075	2	150	62	100	3
Lockheed Corp.	6	050	4	075	2	150	54	120	3
Louisiana-Pacific	6	033	5	040	3	067	62	145	2
Lubrizol Corp.	1	200	1	200	1	200	80	95	2
Lykes Corp.	-	-	-	-	-	-	-	-	-
Marathon Oil Co.	3	100	3	100	3	100	74	85	3
Martin Marietta	6	100	6	100	5	120	78	90	6
Masco Corp.	6	120	6	120	5	100	74	-	5

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
McDonald's Corp.	4	075	4	075	3	100	54	150	3
Mead Corp.	6	067	6	067	3	133	66	105	4
Merck & Co.	6	033	5	040	2	100	68	100	2
Minnesota Mining & Mfg.	6	067	6	067	5	080	62	110	4
Mobile Corp.	5	100	5	100	4	080	75	95	5
Monsanto Co.	6	100	5	120	1	600	70	115	6
Murphy Oil Corp.	4	125	4	125	4	125	74	125	5
NCR Corp.	4	075	3	100	3	100	48	130	3
National Gypsum	5	120	5	120	2	200	70	95	6
Natomas Co.	6	100	6	100	6	100	72	105	6
Northrop Corp.	4	125	3	167	3	167	80	90	5
Olin Corp.		083	6	083	4	125	84	90	5
Owens-Corning	2	250	2	250	1	500	72	105	5
Owens-Illinois Inc.	6	050	4	075	3	100	73	90	3
Paccar Inc.	6	050	4	075	4	075	70	115	3

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
Pan Am World Airways	2	200	2	200	2	200	46	145	4
Pennwalt Corp.	6	067	6	067	3	133	74	100	4
Pennzoil Co.	5	100	5	100	4	100	72	130	5
Perkin-Elmer Corp.	5	100	5	100	3	060	62	130	5
Pfizer Inc.	6	100	4	150	2	200	73	120	6
Philips Morris Inc.	5	100	4	125	4	125	70	110	5
Philip Ind. Inc.	6	050	5	060	4	075	-	-	3
Phillips Petro.	4	125	3	166	3	166	72	115	5
Potlatch Corp.	6	133	5	160	2	400	70	95	8
Raynolds Ind.	5	120	5	120	3	200	76	95	6
Rockwell Intl.	6	083	6	083	3	133	78	75	5
Rohm and Hass	3	200	3	200	1	600	72	110	6
Revlon, Inc.	2	130	2	150	1	300	72	90	3
Safeco Corp.	5	120	5	120	3	200	82	95	6

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
St. Paul Co., Inc.	3	133	3	133	2	200	52	110	4
Sanders Asso.	3	067	3	067	2	100	48	155	2
Schering-Plough	4	100	4	100	2	200	62	110	4
Seaboard Coast Line	6	083	6	083	6	083	52	120	5
Shell Oil Co.	6	100	6	100	4	150	88	95	6
Smith Kline Corp. (Keith)	3	100	3	100	3	100	-	-	3
Southern Railway System	1	400	1	400	1	400	70	90	4
Sperry Rand	6	083	6	083	3	167	72	130	5
Squibb Corp.	5	180	4	100	4	100	70	115	4
Standard Oil (California)	6	083	6	083	5	100	72	105	5
Standard Oil (Indiana)	4	100	4	100	4	100	78	90	4
Standard Oil (Ohio)	5	100	5	100	5	100	80	90	5

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
Stauffer Chemical Co.	6	050	5	060	2	150	60	105	3
Sun Company	4	150	4	150	4	150	80	80	6
Texaco, Inc.	4	125	3	167	3	167	84	90	5
Tiger Intl. Inc.	6	050	6	050	5	060	70	165	3
Trans World Airlines	3	100	3	100	3	100	50	180	3
UAL, Inc.	3	100	2	150	2	150	54	155	3
Union Camp Corp.	6	083	5	100	3	167	64	100	5
Uniroyal, Inc.	5	120	5	120	4	150	82	105	6
U.S. Fidelity & Guaranty	3	167	3	167	1	500	72	85	5
U.S. Gypsum Co.	6	083	5	100	4	125	72	90	5
U.S. Steel Corp.	6	100	5	120	5	120	62	105	6
United Technologies	6	067	4	100	3	133	70	100	4
Upjohn Company	5	100	4	125	3	166	70	105	5
Vulcan Materials	6	067	4	100	3	133	74	85	4

	4 Digits	Ratio	3 Digits	Ratio	2 Digits	Ratio	Disclosure Score	Beta	Number of Segments in Annual Report
Westvaco Corp.	6	050	5	060	1	300	70	115	3
Weyerhaeuser Co.	4	125	4	125	2	250	75	110	5
Williamette Ind.	5	080	4	100	2	200	82	55	4

APPENDIX B

THE FINANCIAL VARIABLES OF THE HIGH QUALITY DISCLOSURE GROUP AND THE LOW QUALITY DISCLOSURE GROUP USED IN THE DISCRIMINANT ANALYSIS

CES	LQ	SZ	CH	PE	DV	DY	EN	EC	LV	EM	TX	EG
1	1.52	9455	7.88	6.6	0.34	0.05	0.14	0.11	0.51	0.05	0.21	7.01
2	2.19	2610	14.49	7.8	0.14	0.02	0.15	0.13	0.33	0.07	0.77	0.12
3	1.79	1867	12.89	6.6	0.05	0.01	0.08	0.07	0.21	0.05	0.94	0.03
4	1.53	1260	8.77	7.0	0.00	0.00	0.15	0.15	0.14	0.05	0.79	0.17
5	1.23	3029	9.94	3.5	0.19	0.05	0.22	0.05	0.03	0.04	0.28	0.07
6	2.00	4155	6.06	6.7	0.32	0.05	0.15	0.12	0.46	0.06	0.00	0.69
7	0.73	2050	15.05	5.8	0.11	0.03	0.18	0.16	0.18	0.06	0.72	0.12
8	2.21	1108	7.13	7.4	0.48	0.07	0.11	0.10	0.22	0.05	0.70	0.03
9	1.96	1677	5.96	7.7	0.44	0.06	0.15	0.10	0.81	0.08	0.42	0.32
10	4.45	1436	4.83	13.3	0.00	0.00	0.16	0.12	0.39	0.10	0.60	0.00
11	1.60	6887	6.28	8.2	0.40	0.05	0.17	0.11	0.99	0.08	0.66	0.23
12	2.51	10584	10.77	7.3	0.45	0.06	0.17	0.14	0.29	0.07	0.70	0.06
13	0.73	2770	11.20	3.5	0.17	0.01	0.15	0.08	2.73	0.02	0.11	0.30
14	2.56	7012	11.10	9.9	0.42	0.04	0.19	0.18	0.06	0.13	0.86	0.07
15	2.81	1131	2.60	11.9	0.28	0.02	0.16	0.16	0.01	0.05	0.09	0.20
16	2.08	1169	5.26	4.8	0.27	0.06	0.18	0.13	0.72	0.05	0.59	0.12
17	2.23	730	8.31	4.8	0.25	0.05	0.14	0.11	0.51	0.05	0.73	0.06
18	1.33	42784	19.45	3.4	0.26	0.08	0.16	0.15	0.21	0.04	0.73	0.10
19	2.64	1063	4.35	5.4	0.53	0.05	0.10	0.08	0.63	0.03	0.83	0.11
20	1.65	2580	11.75	4.6	0.33	0.07	0.17	0.12	0.79	0.03	0.70	0.09
21	1.22	531	9.40	5.6	0.37	0.07	0.14	0.09	1.25	0.12	0.62	0.02
22	1.30	3800	1.81	36.3	0.17	0.02	0.20	0.18	0.11	0.05	0.04	0.20
23	2.19	960	7.53	7.0	0.30	0.04	0.12	0.10	0.45	0.07	0.53	0.24
24	1.22	18069	8.29	6.0	0.47	0.08	0.10	0.09	0.22	0.04	1.43	0.07
25	2.85	912	6.62	6.3	0.39	0.06	0.10	0.07	0.70	0.03	0.72	0.20
26	2.29	1728	7.20	14.5	0.10	0.01	0.15	0.15	0.10	0.09	0.93	0.27
27	1.75	3547	20.04	6.8	0.24	0.04	0.13	0.12	0.30	0.05	0.78	0.09
28	1.78	21076	8.46	12.7	0.54	0.04	0.23	0.23	0.04	0.15	0.87	0.16
29	1.84	6664	9.77	5.5	0.34	0.06	0.10	0.08	0.70	0.03	0.46	0.17
30	1.82	4150	10.63	8.3	0.40	0.05	0.11	0.09	0.49	0.06	0.58	0.22
31	1.96	1648	7.53	5.3	0.32	0.06	0.11	0.08	0.50	0.07	0.96	0.10
32	1.43	712	7.45	13.5	0.86	0.06	0.03	0.03	0.77	0.02	0.27	0.05
33	1.54	1910	9.09	7.0	0.41	0.06	0.15	0.13	0.34	0.08	0.80	0.20
34	2.18	1155	5.90	4.6	0.18	0.04	0.19	0.14	0.68	0.04	1.05	0.14

CES	LQ	SZ	CH	PE	DV	DY	EN	EC	LV	EM	TX	EG
35	2.20	1852	4.43	11.9	0.43	0.04	0.20	0.20	0.15	0.15	0.74	0.12
36	1.09	3400	13.05	8.0	0.07	0.02	0.23	0.13	1.98	0.02	1.00	0.10
37	2.28	1042	5.70	6.1	0.18	0.03	0.15	0.12	0.39	0.08	0.59	0.09
38	1.13	4130	5.95	7.5	0.15	0.02	0.13	0.13	0.07	0.04	0.75	0.05
39	1.62	2322	7.15	6.0	0.27	0.04	0.18	0.12	0.63	0.05	0.78	0.36
40	2.41	1981	5.07	14.2	0.42	0.03	0.02	0.19	0.20	0.16	0.62	0.13
41	2.79	4661	6.51	11.4	0.41	0.04	0.25	0.19	0.18	0.12	0.86	0.11
42	1.04	2204	4.10	3.0	0.47	0.02	0.18	0.11	1.42	0.05	0.10	0.15
43	2.16	2199	7.62	5.0	0.27	0.05	0.12	0.10	0.33	0.05	0.53	0.12
44	2.05	4403	4.83	9.2	0.35	0.04	0.18	0.13	0.54	0.07	0.75	0.13
45	2.38	2850	8.95	4.6	0.30	0.07	0.08	0.07	0.59	0.03	0.68	0.01
46	1.40	7469	0.39	18.0	0.02	0.01	0.03	0.04	0.92	0.17	0.33	0.00
47	2.59	628	4.52	4.6	0.20	0.04	0.12	0.08	1.42	0.03	0.96	0.16
48	2.37	959	2.33	11.0	0.36	0.03	0.15	0.13	0.28	0.07	0.96	0.12
49	1.43	3268	11.33	8.6	0.47	0.06	0.10	0.07	0.78	0.04	1.68	0.09
50	1.44	1762	9.23	5.0	0.24	0.05	0.12	0.10	0.47	0.04	0.75	0.45
51	1.32	2735	13.05	3.1	0.07	0.02	0.16	0.09	1.29	0.05	0.28	0.03
52	1.81	2745	5.77	8.4	0.46	0.06	0.12	0.10	0.53	0.06	0.58	0.08
53	1.69	2110	11.08	5.9	0.33	0.06	0.22	0.17	0.52	0.05	0.87	0.37
54	3.00	1244	3.99	7.4	0.42	0.06	0.11	0.10	0.29	0.05	1.10	0.03
55	2.12	2014	4.27	13.4	0.65	0.05	0.31	0.31	0.06	0.11	1.00	0.09
56	2.13	5700	3.79	7.6	1.00	0.06	0.22	0.08	0.05	0.06	0.82	0.09
57	1.12	515	7.19	4.7	0.15	0.03	0.12	0.20	0.49	0.13	1.41	0.29
58	1.60	3625	9.10	6.6	0.40	0.06	0.14	0.11	0.56	0.44	0.75	0.19
59	1.60	6184	12.53	4.3	0.19	0.05	0.10	0.08	0.41	0.04	0.38	0.15
60	1.96	2460	11.56	11.5	0.24	0.02	0.13	0.12	0.18	0.10	0.88	0.25
61	2.70	969	2.55	10.9	0.44	0.04	0.18	0.15	0.43	0.07	0.88	0.12
62	1.06	1608	7.68	8.5	0.65	0.08	0.06	0.05	0.93	0.04	0.25	0.09
63	1.33	509	6.49	10.6	0.45	0.04	0.15	0.15	0.00	0.09	0.96	0.12
64	1.43	13618	7.60	8.5	0.24	0.08	0.05	0.05	0.43	0.02	0.75	0.00
65	3.22	710	2.35	0.1	0.22	0.02	0.15	0.12	0.31	0.06	0.85	0.13
66	1.28	3511	5.75	4.3	0.19	0.05	0.21	0.05	0.20	0.05	0.28	0.11
67	1.30	2000	4.70	3.5	0.18	0.05	0.22	0.06	0.21	0.05	0.41	0.12
68	2.96	1082	4.10	8.6	0.33	0.04	0.21	0.21	0.03	0.18	0.41	0.17

CES	LQ	SZ	CH	PE	DV	DY	EN	EC	LV	EM	TX	EG
69	1.05	1826	9.59	6.6	0.47	0.07	0.06	0.05	0.99	0.04	1.18	0.03
70	2.00	1328	4.67	7.1	0.34	0.05	0.17	0.12	0.74	0.10	0.58	0.26
71	1.06	3695	16.70	4.3	0.04	0.02	0.16	0.08	2.08	0.02	0.68	0.12
72	1.29	3890	18.35	2.5	0.07	0.03	0.26	0.15	0.99	0.08	0.12	0.46
73	2.50	1192	7.51	8.9	0.42	0.05	0.15	0.13	0.27	0.10	0.55	0.21
74	1.67	11050	7.92	9.3	0.56	0.06	0.05	0.05	0.46	0.02	0.05	0.04
75	1.73	4878	0.48	11.0	0.42	0.08	0.07	0.06	0.65	0.03	0.75	0.00
76	1.70	2670	11.55	4.9	0.31	0.06	0.08	0.06	1.08	0.04	0.66	0.08
77	1.27	2246	8.14	4.5	0.27	0.06	0.19	0.41	0.08	0.04	0.38	0.07
78	1.72	5300	15.63	13.2	0.81	0.06	0.06	0.05	0.56	0.03	0.75	0.13
79	1.30	7033	5.40	4.5	0.30	0.07	0.19	0.05	0.40	0.04	0.38	0.09
80	1.46	3943	7.53	8.7	0.63	0.07	0.10	0.08	0.48	0.03	0.29	0.07
81	2.35	1227	8.59	8.1	0.40	0.05	0.10	0.07	0.10	1.00	3.04	3.02
82	2.99	1422	7.03	5.2	0.27	0.05	0.14	0.11	0.45	0.06	0.89	0.13
83	1.36	60335	10.01	7.7	0.53	0.07	0.14	0.12	0.25	0.05	2.09	0.12
84	0.68	3248	13.03	4.9	0.37	0.08	0.13	0.10	0.53	0.05	0.48	0.11
85	2.93	586	4.63	10.3	0.36	0.04	0.24	0.24	0.00	0.13	0.76	0.17
86	1.10	4509	13.17	7.3	0.34	0.05	0.14	0.09	0.77	0.04	2.82	0.15
87	1.64	1758	11.65	5.1	0.31	0.06	0.16	0.14	0.19	0.08	0.78	0.14
88	1.12	34736	9.51	6.2	0.41	0.07	0.13	0.11	0.47	0.03	2.65	0.11
89	2.47	5018	16.31	6.2	0.38	0.06	0.12	0.09	0.49	0.06	0.90	0.15
90	1.13	1191	9.82	11.1	0.21	0.02	0.10	0.07	1.23	0.04	2.15	0.29
91	3.17	906	5.13	4.9	0.33	0.07	0.15	0.12	0.38	0.06	0.89	0.00
92	1.25	451	20.56	5.3	0.27	0.04	0.16	0.13	0.58	0.17	0.86	0.67
93	1.41	1800	12.50	5.4	0.24	0.04	0.25	0.24	0.10	0.05	0.87	0.26
94	1.73	1560	5.99	6.5	0.34	0.05	0.09	0.07	0.54	0.04	0.39	0.16
95	1.53	1853	6.36	7.1	0.20	0.03	0.20	0.17	0.30	0.07	0.80	0.24
96	1.89	3111	7.74	5.7	0.30	0.05	0.10	0.08	0.65	0.04	0.45	0.11
97	2.36	1685	11.70	4.8	0.26	0.05	0.22	0.21	0.08	0.06	0.88	0.17
98	2.22	921	8.36	7.9	0.44	0.06	0.13	0.10	0.61	0.05	0.81	0.20
99	1.79	63221	16.39	5.0	0.49	0.10	0.20	0.19	0.06	0.06	0.88	0.09
100	0.89	8723	10.54	6.9	0.55	0.08	0.13	0.08	0.57	0.07	0.67	0.08
101	1.49	3515	9.43	9.8	0.27	0.03	0.11	0.11	0.07	0.09	1.70	0.21
102	2.08	7489	6.15	5.4	0.42	0.08	0.11	0.08	0.80	0.03	0.71	0.01

CES	LQ	SZ	CH	PE	DV	DY	EN	EC	LV	EM	TX	EG
103	1.89	4309	7.58	6.4	0.44	0.07	0.12	0.09	0.66	0.04	0.88	0.11
104	1.73	819	9.14	7.1	0.44	0.06	0.13	0.09	1.06	0.05	0.74	0.12
105	1.50	1749	8.64	8.5	0.32	0.04	0.12	0.10	0.41	0.03	0.63	0.07
106	1.50	589	5.00	4.6	0.50	0.05	0.15	0.09	0.30	0.05	0.75	0.16
107	1.44	7828	5.49	5.2	0.29	0.06	0.15	0.11	0.62	0.02	0.81	0.04
108	1.43	2289	8.31	7.5	0.20	0.03	0.25	0.13	1.45	0.01	0.84	0.24
109	1.93	505	3.36	9.1	0.09	0.01	0.15	0.12	0.51	0.04	0.80	0.18
110	1.60	3737	14.20	5.0	0.31	0.06	0.13	0.09	0.34	0.91	0.79	0.22
111	1.27	5600	15.20	7.8	0.27	0.03	0.10	0.08	0.60	0.03	2.40	0.03
112	1.69	5176	10.34	6.1	0.46	0.08	0.18	0.15	0.61	0.04	1.00	0.06
113	2.00	3981	11.06	6.4	0.45	0.07	0.12	0.09	0.56	0.03	0.86	0.13
114	1.29	2585	1.59	6.0	0.61	0.02	0.07	0.06	0.43	0.01	0.67	0.01
115	0.67	40993	15.66	7.9	0.59	0.08	0.12	0.08	0.00	0.13	0.55	0.09
116	1.88	695	6.08	6.9	0.28	0.04	0.19	0.19	0.00	0.07	1.00	0.28
117	1.50	5600	9.14	3.9	0.24	0.06	0.21	0.16	0.61	0.05	0.82	0.21
118	1.63	13800	12.89	7.7	1.00	0.13	0.15	0.10	0.65	0.07	0.74	0.24
119	1.50	5463	6.38	7.0	0.26	0.04	0.22	0.21	0.07	0.06	0.85	0.38
120	1.70	2573	8.41	5.5	0.25	0.05	0.13	0.10	0.42	0.05	0.59	0.66
121	1.99	2509	22.63	5.3	0.27	0.07	0.12	0.09	0.63	0.04	0.47	0.07
122	1.21	1553	10.29	7.8	0.53	0.07	0.19	0.11	1.40	0.08	0.50	0.15
123	2.01	2362	3.98	10.9	0.40	0.04	0.17	0.13	0.69	0.09	0.49	0.11
124	2.35	6632	4.22	9.8	0.30	0.03	0.19	0.11	1.12	0.06	0.83	0.19
125	1.43	6997	7.58	6.8	0.29	0.04	0.20	0.17	0.24	0.10	1.41	0.26
126	1.96	787	6.75	7.1	0.25	0.04	0.15	0.12	0.47	0.08	0.51	0.23
127	2.67	6622	13.61	6.4	0.40	0.06	0.17	0.14	0.33	0.07	0.93	0.09
128	1.47	5668	8.43	6.9	0.48	0.07	0.13	0.11	0.38	0.03	0.95	0.07
129	2.39	1253	10.32	7.8	0.33	0.04	0.10	0.08	0.52	0.04	0.83	0.00
130	2.33	1451	4.72	11.9	0.31	0.03	0.19	0.16	0.38	0.09	0.89	0.18
131	1.41	2176	3.08	4.2	0.20	0.05	0.20	0.04	0.30	0.06	0.32	0.18
132	1.42	11063	9.30	6.0	0.33	0.06	0.13	0.11	0.27	0.07	0.61	0.20
133	1.28	1260	13.59	5.9	0.33	0.06	0.16	0.08	0.77	0.10	0.42	0.13
134	1.59	4179	10.45	7.0	0.21	0.03	0.14	0.11	0.53	0.05	0.95	0.16
135	2.32	1515	3.31	11.1	0.40	0.04	0.14	0.11	0.50	0.08	0.46	0.09
136	1.30	23232	10.12	6.6	0.09	0.06	0.13	0.11	0.30	0.05	0.74	0.12

CES	LQ	SZ	CH	PE	DV	DY	EN	EC	LV	EM	TX	EG
137	1.47	14960	13.59	6.8	0.08	0.06	0.15	0.12	0.38	0.07	1.46	0.18
138	1.40	5197	7.13	8.7	0.21	0.02	0.22	0.10	2.24	0.09	0.49	0.25
139	1.23	7428	12.23	6.0	0.40	0.07	0.12	0.11	0.27	0.05	1.06	0.17
140	1.41	28608	6.71	8.0	0.61	0.08	0.09	0.07	0.43	0.03	1.10	0.00
141	1.34	703	8.70	6.4	0.16	0.03	0.15	0.08	3.00	0.07	1.22	0.03
142	1.82	2735	3.10	9.0	9.50	0.05	0.01	0.02	1.19	0.00	1.76	0.00
143	1.32	3210	4.90	4.4	0.26	0.06	0.27	0.06	0.00	0.07	0.46	0.06
144	2.11	1398	8.58	4.1	0.27	0.07	0.19	0.16	0.26	0.08	0.90	0.09
145	1.82	7050	7.88	8.6	0.42	0.05	0.13	0.10	0.46	0.04	0.98	0.39
146	2.43	1328	5.54	10.1	0.31	0.03	0.20	0.16	0.41	0.10	0.49	0.14
147	1.97	651	7.77	6.3	0.29	0.05	0.20	0.16	0.36	0.08	0.64	0.20
148	2.94	1139	6.77	6.8	0.32	0.05	0.13	0.10	0.51	0.06	0.63	0.24
149	1.83	3799	5.13	9.1	0.30	0.03	0.16	0.11	0.60	0.10	0.44	0.16
150	1.90	772	6.25	6.7	0.24	0.04	0.18	0.13	0.47	0.08	0.68	0.22

APPENDIX C

DIVERSIFIED FIRMS THAT DO NOT HAVE TO REPORT SEGMENTAL DISCLOSURES IN THE 1978 ANNUAL REPORTS

DIVERSIFIED FIRMS (CONTROL GROUP) THAT DID NOT DISCLOSE SEGMENTAL DATA IN THE ANNUAL REPORTS IN 1978

	Beta
Adams Drug	119
Acme-Eleveland Corp.	75
Aileen, Inc.	115
Ampex Corporation	115
Alcan Aluminum	90
Alexander and Alexander	95
Allen Group	110
Allergan Pharm.	130
Allright Auto Parks	85
Amalgamated Sugar	60
Amarex, Incorporated	100
American Bakeries	95
American Building Maintenance	110
American Electric	80
American Family Group	119
American Home Products	105
American Heritage Life	70
American Investment Co.	95
American Medical International	150
American Medicorp	145
American Re-insurance	105
American Seating	80
Anheuser-Busch	125
Archer Daniels MID.	115
Arden-Mayfair	80
Aristar, Incorporated	70
Arlen Realty & Development	115
Associated Dry Goods	100
Atlanta Gas Light Co.	75
Atlanta City Electric	80
Auto Train Corporation	100

	Beta
Auto Data Processing	155
Bally Manufacturing Corp.	155
Bancal Tri-State	75
Bandag, Incorporated	135
Bard, (C.R.)	125
Barry Wright	155
Basic, Incorporated	90
Barwick Corporation	85
Bausch & Lomb	135
Beckman Instruments	135
Beker Industries	115
Berkey Photo	135
Betz Laboratories	125
Benguet Consol. "B"	110
Best Products	150
Block (H. & R.)	145
Blue Bell, Incorporated	125
Bond Industries	100
Boston Edison	70
Big Three Industries	105
Blair, John	100
Braun (C.F.)	135
Brooklyn Union Gas	65
Browning-Ferris Industries	130
Brush Wellman	100
Buffalo Forge Co.	90
Burndy Corporation	85
CTS Corporation	105
Caldor, Incorporated	95
Campbell Red Lake	35
Campbell Taggart	85
Cannon Mills "A"	85
Capital Holding	105
Cardiac Pacemakers	95
Carter-Wallace	115
Carrier Corporation	110

	Beta
Carpenter Technology	100
Carter Hawley Hale	105
Cascade Natural Gas	55
Cenco, Incorporated	100
Central & South West	105
Central Tel. & Utilities	75
Centronics Data Comp.	140
Charter N Y Corp.	75
Chase Manhattan Corp.	110
Chemical New York	85
Chicaga Pneumatic	90
Church's Fried Chicken	155
City Investing Co.	125
Clark Equipment	110
Citizen's Utilities	75
Cleveland Electric	70
Cleveland Trust Corp.	75
Cluett, Peabody	105
Clorox Co.	125
Coldwell Banker & Co.	100
Colonial Stores	75
Columbia Gas System	80
Columbus & South Ohio	75
Commonwealth Edison	80
Commonwealty Co.	90
Comsat	120
Compugraphic Corp.	65
Cone Mills	90
Consolidated National Gas	70
Consolidated Oil & Gas	125
Continental Airlines	150
Continental Illinois Corp.	105
Continental Telephone Corp.	100
Conwood Corp.	135
Cooper-Jarrett, Inc.	95

	Beta
Cooper Tire & Rubber	90
Copeland Corp.	95
Copperweld Corp.	85
Cordis	160
Corroon & Black	70
Cowless	100
Credit Thrift Finance, Inc.	90
Crocker National Corp.	90
Crouse-Hinds Co.	100
Cummins Engine Co.	95
Cunningham Drug Store	85
Data General Corp.	180
Dayton Hudson	100
DeKalb Agriculture Research	110
Deltona Corp.	115
Denny's Inc.	165
Dial Corp.	105
Dick (A.B.) Company	100
Dr. Pepper Co.	150
Dorchester Gas Corp.	155
Dunkin Donuts	125
Edison Brothers Stores	80
First Charter Finan.	145
Faberge, Inc.	110
Falcon Seaboard Inc.	115
Finil Santa Barbara	150
Fisher Scientific	130
Fleetwood Enterprise	175
Franklin Mint	130
Friendly Ice Cream	120
Gateway Industries	100
Golden West Finan.	140
Gorden Jewelry	120
Government Employees Ins.	100
Gray Drug	70

	Beta
Hawaiian Electric	70
Hilton Hotels	140
Holiday Inns Inc.	160
Household Finance	125
IPCO Hospital Supply	145
King's Department Store	115
May Dept. Stores	115
Michigan Gas Utilities	70
Ohio Casualty Corp.	100
Ohio Edison	70
Pacific Lighting	60
South California Edison	80

VITA

VITA

Jacob Olakayode Balogun was born June 20, 1952, in Lagos, Nigeria, the son of Alhaji Taslim Ayinla and Ajimot Ashake Balogun. In December 1967, he obtained a teacher's Grade Two Certificate from Protestant Teacher's College, Lagos, Nigeria. In July 1973, he obtained an advanced teacher's Grade One Certificate from the Lagos State Ministry of Education. In September, 1973, he came to the United States of America for further studies. He then attended Davenport College of Business, Grand Rapids, Michigan. In March 1974, he transferred to Youngstown State University, and received the Bachelor of Science in Business Administration degree in December 1976. In December1977, he obtained a Master of Business Administration Degree in Accounting and Finance at Youngstown State University. In August 1978, he entered Louisiana State University to pursue a doctorate in Accounting.

While in college, Jacob O. Balogun became a president of the African Student Organization at Youngstown State University. He also taught accounting, economics, mathematics of finance,at Davenport College of Business, Grand Rapids, Michigan. He also taught accounting at Youngstown State University. At Kent State University, he taught critical language and Culture and Civilization for two years. While at Louisiana State University, he worked

for Louisiana State University, as a graduate student in the Economic Development Center.

EXAMINATION AND THESIS REPORT

Candidate: Jacob Olakayode Balogun

Major Field: Accounting

Title of Thesis: The Reaction of the Security Market to the Quality of Segmental Disclosures: An Empirical Investigation

Approved:

Jerry C. Trigonell
Major Professor and Chairman

James D. Tranghan
Dean of the Graduate School

EXAMINING COMMITTEE:

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Date of Examination:

October 29, 1980